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CONTRIBUTIONS
TO
GYNECOLOGY
FASCICULUS I.

THE GALVANIC TREATMENT OF UTERINE FIBROIDS:

FULL TEXT OF FIRST FIFTY CASES.

BY

EPHRAIM CUTTER,

A.M. YALE, M.D. HARV. ET UNIV. PENN., LL.D. IOWA.

Associate Member Philosophical Society of Great Britain; Corresponding Member Société Belge de Microscopie and Gynecological Society of Boston; Honorary Member New Hampshire and California State Medical Societies and United States Hay Fever Association; Life Member New York Institution for the Deaf and Dumb; Member Committee for the Revision U. S. Pharmacopœia, 1860, American Medical Association, Massachusetts Medical Society, American Society of Microscopists, etc.

Author Boylston Prize Essay, 1857; Versions and Flexions of the Unimpregnated Uterus; Hot Water and Beef-Plans in Chronic Disease; Clinical Microscope Primer; Cereal Foods; Thyrotomy Modified; Food in Fibroids; Food in Agalaxia; Is Flour our Proper Food? Baked Beans: a Serio-Humorous Medical Paper; Diet in Cancer: 1. Full Text of Nine Cases—2. Theoretical Considerations; The Relations of Medicine to Music; Feeding Patients against the Appetite; Uterine Disease mistaken for Consumption; The Salisbury Plans in Consumption: full text of Seventy Cases, etc.



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WILLIAM A. KELLOGG
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To

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DR. APOSTOLI, Paris	DR. JAMES R. NICHOLS, Haverhill, Mass.
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DR. G. M. BEARD, New York, in memoriam	DR. DAVID PRINCE, Illinois, summa laude
DR. W. SYMINGTON BROWN, Stoneham, summa laude	PROF. J. P. REYNOLDS, Boston
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DR. AMIÉ MARTIN, Paris	
DR. F. H. MARTIN, Chicago	

and other witnesses and operators, this is respectfully dedicated.

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PREFACE.

It has been the writer's aim to collect in one volume his contributions to gynecology. As there was so much interest displayed in the galvanism of uterine fibroids at the Ninth International Medical Congress, this fasciculus is issued, to be followed by others on the diet treatment of fibroids, diet in uterine cancer, electrolysis in cancer, a new edition of contributions to the treatment of uterine versions and flexions, embracing the history of fifty cases of the use of the writer's stem pessary, and conventional diagnosis and treatment versus positive diagnosis and treatment of uterine disease mistaken for consumption.

It may be stated that the paper I was privileged to present, *ut supra*, treated of the subject of measurement, which has seemed to have more weight of criticism with some than the operation itself. The procedure followed in this fasciculus has been accused of defectiveness because of *no measurement*. This statement is incorrect. Measurement has been used as testified to, *ut supra*, by the venerable Dr. A. C. Garratt, of Boston, my son Dr. John A. Cutter, and myself. It should be distinctly understood that five hundred milliampères have been measured on a galvanometer intercalated in the current that traversed a large abdominal fibroid and that the battery measured, direct current, before the operation, twenty-six and a half ampères, and after eight minutes of use on this fibroid, twenty-six ampère

The procedure does not reject measurement, but it does not

affirm that a galvanometer is absolutely necessary, because cures have been effected without measurement at the time of the operation, though the battery was always subject to other practical tests which have been satisfactory. The aim of this procedure is cure. Any other which will do better will supersede it rightly and justly. It is a matter of congratulation that others have tried different procedures. If the one considered here is deemed the severest form, it is gratifying that the other extreme of mildness has been worked up, as the more light is thrown on a dark subject, the better for those interested. In time to come it is hoped that all will amicably work together to see if better results cannot be secured by increased interest, participation, and varying of the details

THE ARISTON, Broadway and 55th street,
New York City, Sept. 13th, 1887.

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I HAVE decided to present these cases in full, that the origin and progress of this treatment may be better known and understood. Besides, some cases, after the lapse of a decade, having proved cures which were previously reported as partial successes, it seems right to insist that time is an element that must not be overlooked in the consideration of this method.

They will bear careful reading, for nearly every one has its individuality and special lesson.

For example: One shows the effect of the penetration of the current without anesthesia; another, the want of encouragement from the first operations; another, the formation of an abscess; another, malignancy; another, the difficulties of penetration and the evolution of the electrodes used; another, the rapid disappearance of the growth; others, the relief from pain; others, the disappointment of no good result; others, the result in death; and so on.

I give due credit to Dr. Gilman Kimball, of Lowell, Mass., with whom the operation was pioneered by me.

APPARATUS EMPLOYED.

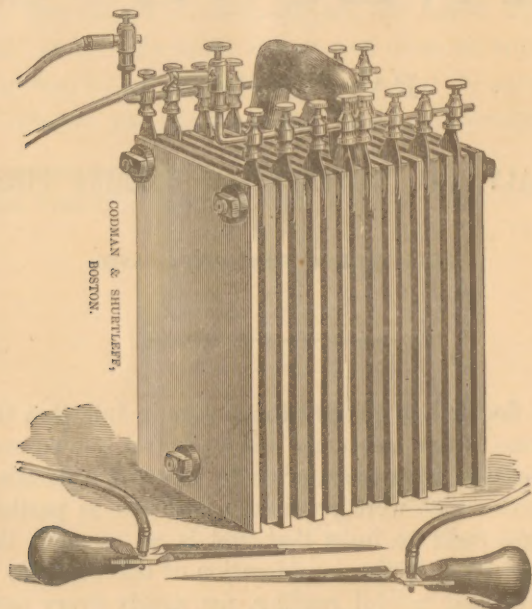
The Battery.—Stæhrer's pattern. Eight (8) plates of carbon, nine (9) by six (6) inches; eight (8) plates of zinc, nine (9) by six (6) inches.

The carbons were one-fourth inch thick.

The zincs were one-eighth inch thick.

They were arranged so that the zincs should come on the outside; thus: zinc, carbon, zinc, carbon, zinc, carbon, zinc, carbon, carbon, zinc, carbon, zinc, carbon, zinc, carbon, zinc.

The carbons are connected on one side, and zincs on the other.



Battery and Electrodes.

1884. Apostoli reports his highest power to be one-fifth ($\frac{1}{5}$) ampère, and his lowest power one twenty-fifth ampère.

About 1874, Mr. Moses G. Farmer, of Boston, the most noted mechanical electrician of his day, tested the battery and found it exceeded all his measuring instruments in power.

Later, Dr. A. C. Garrett, of Boston, went to large expense for a voltameter, but this was insufficient to measure the battery's full power.

1886, December 14th. The battery, in working condition, was measured by the Stout, Meadowcroft Company, of 84 Fulton

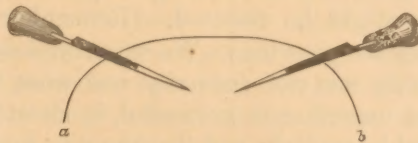
street, New York, and found to have *twenty-seven* (27) *ampères* direct current.

Solution.—Potassic bichromate dissolved in cold water to saturation. Add to one gallon of this saturated solution eight (8) ounces of commercial sulphuric acid.

The conductors are connected with the battery by binding screws on the ends of the rods of copper. They are made of strands of *copper-wire* covered with knit worsted. Those made of pure silver are more flexible and lighter. The writer has a pair of them and prefers them to the copper, except for the expense.

The electrodes are peculiar. Were it not for them, this series of cases would probably never have existed. It is a small matter, perhaps, to speak of, but *not* a small matter *practically*.

Certain, controllable, and deep penetration has been regarded as an essential. It would not answer to have an electrode that



Abdominal Penetration.

would twist, jump, or shoot off wildly among the viscera. The fibroid alone must be penetrated deeply and in the direction which the operator deems the most desirable. The following device has been found to answer every purpose: An ordinary surgeon's director was taken, its point and edges were sharpened, an ebony handle was fitted to the flattened end, and two inches of the larger end were japanned for insulation. The dimensions are as follows: Length of instrument over all, eight and one-half ($8\frac{1}{2}$) inches; of blade, four and seven-eighths ($4\frac{7}{8}$) inches; width of blade at widest part, three-eighths ($\frac{3}{8}$) inch. The foramina in the metallic portion of the handle are sufficiently enlarged to readily take in the ends of the conductors. The angle made by the two wings of the blade may be represented in section by the letter V. The point of the angle is made dull. The effect of this arrangement is to draw the tissues over the sharp edges, represented by the free ends of the letter V, and thus cause a ready section of the tissues penetrated. It is evident also that the union of the two blades at this angle offers

a great resistance to bending in any direction, as seen in the firm union of the nasal bones of the face, or in the corrugation of metallic life-boats. It has been found that these electrodes become granular and dull by use, rendering it advisable to have them sharpened often. It has also been found that the introduction is facilitated by making punctures through the skin with a lancet.

Why was this kind of a battery used?

Why were not small cells employed?

It is not the purpose of this paper to discuss, but rather to report; still a few words may be given here in reply to these questions. In the beginning of our essays, we had no practical guide to go by, as the field of uterine fibroids and galvanism was an unexplored one. In the case of such dense structures, we did not expect to burn or chemically decompose them, but we did try to impress them in such a manner that the processes of nutrition should be so changed by this action that the normal balance might be restored. (Remember we thought only of *arresting* the growths.) We were impressed with the idea that *quantity* and *not intensity* was what was wanted; that, to have the experiments successful, it should be a *large current*, thoroughly applied; and that the way to secure quantity was by having large surfaces of metal.

But we do not insist upon our ideas being carried out to the letter. We are willing to yield the point and say that our battery is not the best, whenever any one will produce the favorable results that we are happy to record, by any other battery. We have looked in vain elsewhere for such a series, and *so long as our experience is what it is*, we do not *conscientiously* feel *justified* in *practising* this operation with *any other* battery, or indeed *without* any battery, as some have suggested.

To use a homely phrase, "the proof of the pudding is in its eating," and we must be governed by our practical results. We cannot set aside our apparatus for another which has not been tried so thoroughly or satisfactorily as this has been. In this position we have been encouraged by the advice of electricians who have personally examined the battery and gave the advice to continue its use, though against their own interest to do so.

Modus Operandi.—"It is well understood that these growths are composed of a feebly organized tissue possessing but a low

degree of vitality; consequently they tolerate local interference badly. In *two* well-marked cases, where the surgeon, after having begun an operation for the removal of an ovarian cyst, very soon found himself attempting to dislodge a large fibroid uterus, the operations were suspended, and the patients recovered. Immediately following the recovery, however, the fibroid growths began to sensibly diminish in size, and ultimately they disappeared altogether. So, may not the shock or force from a powerful galvanic battery, communicated to the tissue of a fibroid, so far interrupt or interfere with its nutrition as not only to arrest further development, but eventually to effect its removal altogether?" (Kimball.)

It is possible that there may be something else in the composite galvanic current that remains to be recognized by physicists, especially when it is caused to traverse a living body which has been proved by scientists to be full of currents of electricity. May it not in disease be conceived of as capable of modifying the functions so as to restore their normal balance? In our present state of knowledge, inquiries or speculations like these are of no great practical value, inasmuch as it is not necessary to understand all the rationale of things before their use. It is asking too much to *insist* upon a rationale. As the one born blind mentioned in Scripture history said, when questioned after having been restored to sight, "one thing I know, that whereas I was blind, now I see."

What is here is the evidence of what has been done, and the means by which it has been done, and this evidence is subject to the general rules that govern evidence in the court of common sense.

Application of the Electrodes.—The patient is anesthetized and the electrodes are introduced deeply into the substance of the growth so that they do not approach each other within a half inch.

Where?—This usually depends upon the circumstances of the growth. If unilobar and in the cavity of the abdomen, one electrode is passed through the skin in on one side of the tumor, and the other in on the other side of the tumor. Or if the lobe or tumor is small, one electrode may be passed under the other at a distance of half an inch. If the tumor occupies the cavity of the pelvis and has several lobes in the abdomen, one electrode may be pushed in from the rectum or from the vagina, and the

other electrode may be passed in through the abdominal walls. If the fibroid is confined to the pelvis, both electrodes are to be introduced through the rectum or vagina. Care should be taken to avoid any strongly pulsating blood-vessel. It has been found immaterial as to which electrode is passed in or placed first.

How Long did the Applications Last?—They have varied from three to fifteen minutes in duration. The latter time is too long. Our best result was accomplished with only three minutes' continuance of the current. The length of time was adjudged from the systemic symptoms. If the pulse became accelerated, the respiration hurried, the face pinched, the countenance hippocratic, and the skin sweaty and cold, it was thought time to stop. Etherization masks these symptoms somewhat, and should be allowed for, that is, not to push the time too far. The first operation should be short, and, if well borne, the time may be increased in future operations.

How Often may Applications be Made?—This depends upon the case. It has been done every day for a week. Usually once a week or a fortnight. If the systemic and local effects were not severe, the operation was renewed oftener than when the effects were profound.

Treatment of Patients.—Usually put to bed and arrangements effected whereby they may lie quiet for a few days.

If, on the next day, they have no pain, feel well, have a good pulse, normal skin, good appetite and morale, they have been allowed to move about at will. If they have had severe pain, morphia subcutaneously and hot alcohol and water, equal parts, to the abdomen are resorted to. If there was prostration, stimulants were used. It is a severe operation and should be so regarded by the patient in order to insure proper care and nursing. It is astonishing how well some bear the operation.

RESUMÉ OF CASES.

Series 1; non-arrests, seven cases.

Series 2; fatals, four cases.

Series 3; arrests, twenty-five cases.

Series 4; relieved, three cases.

Series 5; cured, eleven cases.

Total, fifty cases.

SERIES I.; NON-ARRESTS, SEVEN CASES.

CASE I.—*Fibro-myoma; two trials of electricity; improved feelings after second operation, otherwise no favorable result; patient disgusted and refused further applications; death from hemorrhage and exhaustion; autopsy verified the diagnosis. This was the first case in which it was employed. Operators, Ephraim Cutter and Gilman Kimball.*¹

Mrs. Robert Pierce, of Melrose, Mass., a lady of 36 years, first consulted me August 15th, 1870, on account of a large tumor in the pelvis and abdomen, which interfered with micturition. It was first noticed about four years previously, when she directed her husband's attention to it, after a recent confinement. Dr. M. Parker, the family physician, had latterly been obliged to use a catheter, although the dysuria had troubled her somewhat for six months previously, and was worse at the menstrual epochs. Mrs. P.'s youngest child at the time was four years old. About two years after the birth of this child, menstruation was arrested for three months, at the end of which time she discharged, *per vaginam*, a hard mass, the size of a fist, in which no trace of a fetus or placenta could be detected. At my first visit, a careful examination showed the presence of a large hard tumor, extending from the os uteri to a space midway between the pubis and umbilicus, and occupying the posterior uterine wall, with which it seemed to be incorporated. The sound passed easily to the depth of four inches. The os readily admitted the forefinger as far as the whole finger could reach; the anterior wall was thin and distensible, and the whole tumor was quite movable. Dr. Ephraim Cutter, of Woburn, saw the case in consultation a few days later, and fully concurred in the diagnosis, namely, fibroid tumor of the posterior wall. The patient was subsequently visited by Drs. W. F. Stevens, of Stoneham, and Day, of Wakefield, and Dr. Holmes, of Lexington, and we all arrived at the conclusion that it would not be advisable to attempt removal of the tumor by abdominal section, which at that time seemed the only feasible process.

On two different occasions towards the close of August, free incisions were made in the tumor with Atlee's knife, each time followed by moderate bleeding and temporary relief.

It was hoped that the vitality of the growth might be in this way destroyed, but its great size prevented so desirable a result. Early in the morning of October 8th, 1870, I was sent for on account of severe flooding. Dr. Parker had visited her through the night, and had plugged the vagina with a large sponge, which I removed, and injected a strong solution of the persulphate of iron (Monsel's styptic). No farther hemorrhage occurred, but during the following night a fetus of three months, enveloped in the membranes, was expelled. Examination, a week later, showed

¹ Reported by Dr. W. S. Brown, of Stoneham, Mass. Published in *Philadelphia Med. and Surg. Reporter*, Feb. 8th, 1873.

that the tumor itself was reduced in size slightly. During the spring of 1871, the patient's husband had his attention directed to an operation performed on General Kilpatrick by Dr. R. P. Lincoln, of New York, for the removal of a tumor in the neck as large as a goose's egg by means of electrolysis, which proved entirely successful.

Mr. Pierce visited the general soon after, and ascertained that the newspaper account was substantially correct. General Kilpatrick's tumor was diagnosed as "venous erectile," liable to sudden distention to twice its ordinary bulk (a full account of the case may be found in the *New York Medical Record*, December 15th, 1870, Vol. V., No. 20), whereas in Mrs. Pierce's case the tumor was nearly as hard as cartilage, and not subject to much variation in size. Still it was concluded to make a trial of electrolysis, which was done *twice* under Dr. Cutter's supervision.

First operation. Operator, E. Cutter.

On the first trial, August 21st, the two needles were passed side by side through the vagina, penetrating barely an inch. The current from a large Stehrer's battery was applied for fifteen minutes with no appreciable result.

Second operation. Operator, Gilman Kimball.

A second attempt was made eight days later with stouter needles, but the tumor proved so hard and resistant that they penetrated but little farther. Dr. Gilman Kimball, of Lowell, was present at the second trial, and inserted the needles. The current was passed for ten minutes. No change resulted. No diminution in bulk, and no softening. Two days afterwards, a severe flooding occurred, but not caused by the operation. *In fact, she felt better than usual during these two days.*

Friends from a distance came on a visit. In the afternoon, she ironed some clothes, and during the following night she was seized with flooding, which continued at intervals for ten days. From October, 1871, to December, 1872, the day of her death, I did not see Mrs. P—— again professionally. She was decidedly opposed to making another trial of electrolysis. She rallied pretty well from the hemorrhage, which occurred in September, 1871; but the flow at the monthly periods was more profuse after this till January, 1872, when it was slight at first, but continued to dribble away during the whole month. Towards the end of February, a hard lump, about the size of a hen's egg, came away. It was preserved for examination. Her general health about this time became much reduced. In March, she had another severe flooding, after which she became anemic and jaundiced-looking, and her appetite failed. During the summer months, she improved a little. In October, 1872, she was again prostrated with hemorrhage, which continued for three or four days, and in November the bleeding returned and lasted for three weeks. One week before death, the flow suddenly stopped, and did not return again. She was confined to her bed during the last three

weeks of her life, and was latterly troubled with attacks of nausea and vomiting.

Post-Mortem Examination.—Thirty hours after death; only the abdomen was opened. Body not emaciated, skin yellow, intestines distended with gas, stomach slightly congested, but otherwise healthy; liver normal. The tumor occupied the true pelvis and also the front part of the abdomen nearly to the umbilicus, but was entirely free from adhesions. The fundus uteri and greater part of the body projected anteriorly and superiorly with the ovaries (which were twice the natural size), Fallopian tubes, and round ligaments. The whole mass was carefully removed. It weighed nearly four pounds. On making a section through the inferior part, the tumor was found to be fibroid, enveloped in a capsule about one inch thick. The tumor was grayish-white, the capsule red. A microscopical examination of the tumor proper demonstrated it to consist principally of connective tissue closely interlaced, along with a few non-striated muscular fibres.

Remarks.—This case is quoted somewhat in full because it gives the natural history of a uterine fibroid terminating of itself in death. It is also interesting as being the first case where a regular and determined effort was made to try the effect of electricity upon a uterine fibroid with the desire of arresting its growth, though unsuccessful. I say “determined,” because if there had not been a fixed and settled *determination* to settle the question, the result of this case would have deterred us from any further efforts, and the present series of cases would not have been collected. The fact that the general health was improved after the second operation ought to have encouraged the operator, but it was overlooked in the general cloud of dissatisfaction that settled down over this case.

CASE II.—*Large myo-fibroid; softening and fluidity followed first operations; tumor larger; case obstinate; abdominal section successful; recovery. Operator, Kimball.*

Mrs. M— resides in Waltham, Mass., 40 years old. She had a uterine fibroid, interstitial, involving the body, but not the cervix. It was not uniform, but consisted of several lobes, and was of a size to suggest a six months’ pregnancy. It was attended with no hemorrhage. The principal inconvenience was a sense of fullness and pressure. Occasionally it interfered with the bladder, causing frequent micturition. Dressmaking being her occupation, she was obliged to abandon it for the time on account of the disease.

First operation.—April 21st, 1874, she came under the treatment by galvanism. The patient was anesthetized, and the electrodes were thrust into the tumor through the abdominal walls to the extent of three and a half inches. The galvanic current

was continued for ten minutes. The impression upon the system during this time was not specially marked, and no special change of condition, local or constitutional, followed. In three days, the patient felt as well as if nothing had ever been done.

Second operation.—On the 24th, galvanism was applied the second time. The effect was more marked. Some feverish action, nausea, and occasional vomiting followed. No appetite. This state of things continued for four days.

Third operation.—On the 24th of May, she returned for treatment. Tumor of abdomen larger. The operation was repeated for the third time, and showed the disease to be complex, probably fibro-ovarian, as there was a free discharge of serum from the aperture made by one of the electrodes. This discharge continued for some time. It may be here remarked that this oozing of serum occurs frequently when there is ascites existing in connection with cases operated upon in the manner alluded to here.

Fourth operation.—Other operations were resorted to, and the case proved to be obstinate. Abdominal section was resorted to for the reason that it might be ovarian. It was found to be a pedunculated fibroid attached by a broad band to the uterus. This was severed. The fibroid was removed, and the patient made a successful recovery. The interstitial uterine portion gives no trouble or evidence of its existence. It is possible that the galvanism had something to do with the softening and fluidity. But this case is counted as one in which the galvanism had no effect, because laparotomy was resorted to before relief was obtained.

CASE III.—*Enormous fibro-myoid; Allee's treatment of sal ammoniac tried faithfully for ten years; electrolysis repeatedly applied; all without result; life became such a burden that laparotomy was resorted to; tumor removed; death from peritonitis fourteen days afterwards. Operator, Kimball.*

Mrs. S., of Boston, Mass., presented herself in 1872. She appeared larger than a woman at term—of enormous size. She was about 40 years of age. Her general health was good. She suffered only from the looks, the great weight, and the distention. Face and complexion healthy. She had used the chloride of ammonium continuously and thoroughly for about two years without any success, still she was desirous of doing anything that might promise relief, and strongly urged the removal of the growth by the knife.

Several operations.—Electrolysis was thoroughly resorted to several times. She was not made sick at all. No systemic or local disturbance occurred. The tumor was in no way affected, not diminished, not softened, not made sore. She continued her original entreaties for removal by abdominal section. At last her breath became very short, and an excessive serous vaginal discharge prostrated her. Life became a burden, and so long as there was

a possibility of relief, she was willing to run any risk. In October, 1876, with the full understanding and consent of all parties interested, laparotomy was resorted to, apparently at first with success. The tumor was readily and successfully removed. Present, Drs. F. Semeleder, of Mexico; Bixby, of Boston; Carr, of Concord, N. H., and Cutter, of Woburn.

It was pedunculated. There was so little shock after the operation that the pulse showed no acceleration or disturbance whatever. The patient desired to see the tumor, and inquired after the details of the operation with the coolness of a third person. But in the course of fourteen days she died of peritonitis—a result not commensurate with her courage.

CASE IV.—*As yet no relief to symptoms; in progress. Operator, Kimball.*

Miss D—, school teacher, middle aged, 35 years; has a fibroid tumor of the uterus, and is now under treatment. She has submitted to a few operations with as yet no relief.

CASE V.—*Operator, Kimball.*

1877, February 1st. A married Irishwoman, childless, living in Lowell, was operated upon by galvanism at this time for uterine fibroid. No injury or other effect was produced except to frighten her husband, who, when Dr. Kimball proceeded to his house to apply the battery the second time, strongly objected, and further treatment was suspended.

Not heard from since.

CASE VI.—*Fibro-ovarian; one puncture; percutaneous galvanism advised. Operator, Cutter.*

1877, June 11th. Mrs. M. E. H., Chicago, Ill., 40 years of age. Twenty-two years in married state. General health poor. No children. Five or six miscarriages. Dyspepsia. Constipation. Bleeding piles. Kept awake by pain at night, obliged to take morphia for the relief of pain over the left ovary. Commenced the trial of ergot April 27th, 1876. At this time the abdominal measurement was forty-eight inches, now it is thirty-four inches. Present complaint is of a distress in the epigastrium.

Physical signs of ascitic fluid. Multilobar tumor in abdomen, and *solid growth* in pelvis attached to and incorporated with the uterus.

Diagnosis.—Fibro-cystic. This was confirmed by Prof. Byford, Drs. Fisher, Hyde, Clark, Fitch, W. Charles Smith, all of Chicago, and Dr. Jones, the attending physician. All of these gentlemen, by request of the writer, personally examined the case beforehand. The battery was tested and the patient etherized. One electrode was plunged into the left tumor which felt the hardest. The instrument penetrated with great facility, and a dark adhesive fluid escaped by the groove of the electrode. Under the microscope, this fluid displayed Gluge's and Drysdale's ovarian cells, showing or helping to show that the cyst entered was

ovarian. The operation was not completed in this form. On account of the fluid nature, the small battery hitherto described was employed per cutem. Report of result has not reached the writer. The case was evidently fibroid combined with ovarian disease, as decided by the pelvic portion. It is placed in the list, as its history shows the difficulties in the way of diagnosis. It was a mistake not to have aspirated previously to the application of the galvanism.

Subsequently, laparotomy by Dr. Jones (I think) cured this case, confirming the above diagnosis.

CASE VII.—Large tumor; no benefit resulted from several applications of galvanic electricity. Operator, Kimball.

Mrs. M., of Waltham, May 13th, 1875; is aged 44 years, and been married nineteen years. Never had children. A fibroid growth of the uterus began to be perceptible seven or eight years ago. Probably it had existed some years before this time. This is inferred from the fact that she has suffered from menorrhagia ever since she was married. Its size at present indicates a weight of twelve to fifteen pounds. It extends well up toward the umbilicus, also downward into the vagina. Hemorrhages are less frequent than formerly, but more persistent and with less loss of blood. She suffered from downward pressure and abdominal distention. She has lost flesh of late, and finds the labor of dressmaking fatiguing and unusually irksome.

First operation.—Electrolysis was applied this day. One electrode was thrust into the abdominal portion of the tumor, and the other per vaginam into the inferior portion. The effect was marked by no special symptom other than a sense of nervous prostration.

Second operation.—Electrolysis was repeated on the 11th of June. During the interval she has suffered somewhat on account of having, as she says, taken cold, which caused some fever, loss of appetite, and loss of strength. She also says she has had daily chills, followed by fever and sweating; however, she has recovered from the effects of the cold, and the chills have ceased; both electrodes were introduced through the abdominal walls; the operation was well borne. No unpleasant symptoms followed.

Third operation.—June 15th. Galvanism repeated through the abdominal walls.

Fourth operation.—17th. Galvanism repeated. One electrode passed through the tumor above the pubis, and the other per vaginam. No relief followed these trials of electricity. The tumor was not arrested.

SERIES II. FATAL, FOUR CASES.

CASE VIII.—Fatal case; death caused by the operation four weeks after third application; asthenic type of typhoid fever; tumor fibro-cystic, of at least ten years' standing. Operator, Kimball.

Miss H., age 28, resided in Portsmouth, N. H. In 1864, she consulted Dr. Kimball on account of an abdominal tumor. She had supposed her case to be ovarian. It proved to be a fibroid uterus; she was told that nothing could safely be done surgically, and she was advised to take no medicine with the view of its doing any good so far as the tumor was concerned. Ten years elapsed and she heard of some favorable results from the use of galvanism. This induced her to make a visit to Lowell, especially for the purpose of giving it a trial. Although she was somewhat run down, and in a not very promising condition, still her importunity was yielded to rather against her surgeon's best judgment.

First operation.—In June, 1874, the battery was applied in the usual manner. It was the day after her arrival. The tumor was found to be very much larger than when first seen ten years before. It was also softer. An inexperienced, or rather, a surgeon unacquainted with the case, would have taken it to be an ovarian multilocular tumor; it was fibro-cystic. An exploratory operation was made with an aspirator, puncturing what seemed to be a cyst. Nothing was evacuated but bloody serum. The electrolysis was applied in the usual manner, the electrodes penetrating the abdominal parietes. A copious discharge of bloody serum followed the introduction of the electrodes, running through the grooves of these instruments. The flow continued for twenty-four hours through the punctures after the electrodes were withdrawn. The general effect of this trial of galvanism was not remarkable, except that it seemed to be followed by a decided diminution of the tumor, owing, perhaps, only to the amount of fluid escaping through the punctures.

Second operation.—A second operation was performed later in June, 1874. On this occasion, there was a more decided impression made upon the system. There was pain in the abdomen, vomiting, hebetude, headache, fever, prostration, etc. These unpleasant symptoms disappeared in the course of twenty-four hours, so that on a later date of June a third operation was performed.

Third operation.—The symptoms following this were more severe than on either operation before. The vomiting was severe, pain greater, and more prostration. The leaking, however, through the punctures was less. All the bad symptoms disappeared in the course of the next day. The patient was confident that the tumor was much lessened in size. But the symptoms of profound exhaustion and extreme weakness recurred soon after. This was combined with an asthenic type of typhoid fever which finally put an end to her life in about four weeks after the date of the last operation.

Remarks.—This case was the first fatal one of the series which might be directly charged to the operation. It shows the impropriety of one's yielding up the dictates of best judgment to

the importunities of a patient who has become possessed of the idea of having an operation of a given nature performed in the hope of relief. The *copious* discharge of fluid was an unusual symptom. It is often seen in ascitic cases in a slight degree, and usually, when limited, causes no trouble. It is possible that the case was malignant. There was no autopsy. When one considers the ordinary result of punctured wounds of the peritoneum, it is certainly remarkable that no more patients have perished under the present operation. Indeed, one thing that these cases go to prove is, that galvanic peritoneal punctural penetration can be effected with such comparative safety. One death in twelve cases is not a very great risk to run in abdominal surgery. In all these cases, the patients have been made to understand the risks that are undergone in this operation, and that if they choose to run them, the operation will be undertaken upon their own responsibility. The patient in this case presented herself with her mind made up to submit to the trial of this operation. In this psychological condition nothing is satisfactory to the patient except the performance of the desired procedure, and when held back she says: "I don't care if I do die." This mental condition is a curious one. The fatal result, however, teaches that the surgeon should not allow his acting against the dictates of his judgment.

CASE IX.—*Fibro-cystic; one operation; patient, contrary to orders, got up, dressed, went into cold rooms, and was seized with chill; died in six weeks; cyst ruptured opposite to punctures; disobedience the cause of death. Operator, Kimball.*

Mrs. B., seen in consultation with Dr. D. Humphreys Storer, aged about 50 years; no children. Her tumor had existed for one year previous to the date of her operation, in Feb., 1875. It was packed in the pelvis and also presented itself in the abdomen. Both portions were identical with each other. The feel was hardish and the sensations of touch it gave were equivocal. I thought it might be ovarian, but decided it was fibroid and she submitted to *one operation* as above with the battery. The electrodes were passed through the abdominal walls, and the current was continued for five minutes under ether.

Next day she felt nicely and, contrary to advice and express injunctions, she got up, put on her clothes, and went about the house as if nothing had happened. The house was not heated by a furnace all over, and she went into cold rooms, exposing herself unwarrantably. Naturally enough, she took cold and was seized with chills and went to bed sick. She became bloated and swelled in the abdomen. It was thought she would come out of this, as her tem-

perature was under 100° F. for a fortnight and the pulse not much accelerated. She died six weeks after the operation. It was expected on a post-mortem examination to find a cyst puncture, and the leaking therefrom to have caused peritonitis. On the other hand, the autopsy disclosed no inflammatory or other pathological results about the sites of puncture, but a rent was discovered in the cyst, one inch in length, located on the side of the cyst opposite to the punctures.

Fibro-cystic rupture is rare and not necessarily fatal. This cyst must have ruptured about the time of the operation. Whether the latter had anything to do with the bursting, we cannot tell. But in the light of the experience, afforded by the other cases recorded here, it is felt that if she had remained in bed as she was told, and obeyed the injunctions of her physician, probably there would have been a good result. Under the circumstances, the death is not chargeable to the operation. The facts, up to her own foolhardy action, read like those in which the operation was successful. In all cases of this operation, the patient is undressed, put to bed, and *kept there till suffered to rise by the operator*. The time of lying varies in different cases, and its length must be determined by the systemic and local symptoms. Supposing the cyst had been ruptured by the introduction of the electrodes in this case, if she had kept still and quiet in her bed, her natural powers would probably have sufficed to have taken care of the effusion. The sad result of this case brought some bad reputation upon the operation with those who did not know all the facts.

CASE X.—Abdominal tumor; at first very hard; after two applications assumed a cystic form; regarded as improved; third operation followed by typhoid symptoms; neglect of ordinary care; death. Operator, Kimball.

Mrs. U., widow, 50 years of age in 1874; had one child. Resided in Rockland, Mass.

Presented a very hard abdominal uterine tumor. She submitted to *two applications* of the battery, and thought she was improved and the tumor diminished; she then returned home from the hospital and remained two months. There was no vaginal discharge. On her return, the tumor was found to have changed its character, became soft, and presented the physical signs of a monocystic fibroid. No pain; but she was troubled with the bulk of the tumor, and the fear that any one should know about its existence.

Third operation.—One application of the battery was made. Fluid of a sanguinolent character copiously exuded through the punctures. There was no chill and no fever. She lost her ap-

petite, and her case assumed a prostrated, typhoid aspect. Still she was able to return home in a short time. From the account received, she was neglected, as she foolishly refused to have a physician, until she was sinking and moribund, too far gone for any relief. She had the feeling that she would be better all the while. Her symptoms were those of septic poisoning. Death occurred fourteen weeks after the last operation. No one knows but that she might have been saved if she had received ordinary attention. The patient should remain under some professional oversight. It would have been better to have kept her in the hospital.

CASE XI.—Fatal case after a second application; relief from pain by the first application; severe peritonitis after second operation; death in eleven days; patient a morphia-eater—a circumstance that masked the symptoms that usually indicate a too large dose of galvanism. Operator, Cutter.

1876, August 4th, Miss F. C. C., spinster, resides in —, age 44, this day presented herself to have the operation of electricity performed upon a uterine fibroid. She was accompanied by Miss Tyler, Case XLVIII. She was a small, spare woman, quiet but determined in demeanor. She said the tumor had existed for eight years. Her relatives afterwards said ten at least. She stated that she was troubled much with pain and distress in the region of the bladder, and that such had been her suffering that she had been obliged to have recourse to the use of morphine during the whole period of the tumor's existence. At times she took a drachm-bottle of the sulphate of morphia per week. She was influenced by the fact of the relief that Case XII. had experienced, and had made up her mind to try the same method, in the hope that her pain also would be removed, and she do away with the morphia. On examination, the tumor was found to be dense and multilobar. One large lobe blocked the pelvis, packed the vagina, and crowded the rectum. The uterus could not be detected. Eight or ten small, freely moving lobes could be readily felt in the abdomen. There was tenderness on pressure over the tumor. There were signs of chronic bronchitis.

The experimental character of the operation was fully rehearsed to her, and she expressed a full understanding of the dangers to be run. She insisted upon an early performance, and arrangements were made for her to go down to the seashore and have the operation with the benefit of the sea air. On August 12th, she went to West Falmouth, Mass., and bore the journey well.

First operation.—On the 14th, the battery was applied. She was fully etherized. One electrode was passed through the rectum into the tumor about four inches. The other electrode was passed into the most prominent lobe on the right of the navel. The current was very powerful and was continued for ten minutes. A triple dose of morphia was subcutaneously injected after the operation. The pulse did not vary much from 86

throughout. Afterwards there was pain and prostration. Hot fomentations of diluted alcohol were kept on the bowels. There was some vomiting, which was attributed to the ether. Appetite poor. But she insisted that the "*great pain*" had been abated, which caused her to be very well satisfied with the application. From the unusual length of the continuance of the prostration, the writer was not so well satisfied, and when importuned to repeat the application, put her off until August 24th.

Second operation.—One electrode was introduced through the rectum, and the other into a lobe further to the right of the navel. There was some difficulty in penetrating this lobe, as it slipped away from the hold. The current was passed *ten* minutes. The pulse kept up to its normal rate, also the respiration, and there were no signs of collapse. The morphia, I think, masked the effect of so prolonged an application. *Five* minutes would have been quite enough. On awaking from the ether, there was considerable prostration and distress. There was no vomiting, so morphia was given by the mouth, and fomentations of alcohol, as before. August 29th. Pulse a little quickened. Pale and prostrated. Pain over the site of the abdominal puncture. On the 30th, a telegram summoned me to her bedside. She was found comfortable. She had experienced severe paroxysms of distress in the epigastrium and abdomen, that appeared to be very dangerous to life. She did not take much nourishment. Was swelled in the right epigastrium.

31st. Left her in charge of Dr. L. H. Luce. September 2d. Another summons by telegraph. No communication could be had before the 4th. Her pulse was 96, respiration 24, and she was comparatively comfortable. The bad symptoms of the 2d were slow and irregular breathing, lead-colored mouth and face, probably opium-poisoning, as, though a morphia-eater, she was taking morphia by the mouth, and laudanum by the rectum. There was a swelled and tender abdomen; the thorax was normal, except some coarse rales scattered here and there. Advised good nursing, rest from neighbors, beef-tea enemata, ice by mouth, and less morphia. She was left conscious and rational. Death occurred on the 8th. "Before death," Dr. L. writes, "there was universal tenderness, acute pain; pulse 120-130 and small, temperature 103-104°. Nausea and finally delirium. . . . The symptoms were, towards the close, of a typhoid character." There was no autopsy.

Remarks.—When the deep penetration of the abdominal cavity is considered, it appears remarkable that more deaths have not occurred before. It seems that the electrical current confers an apparent immunity upon these punctures. No inflammatory results were reported in General Kilpatrick's angiomatous tumor cured by a constant current. A certain percentage of deaths are expected in any severe operation. The

opium served to deceive the physician and the patient herself; it clothed her with a semblance of strength which was a genuine counterfeit. Still it hardly appears right to deny to a morphia-taker the chances of benefit of a given operation. But in such a case the history of the present instance teaches us to be very cautious and moderate in the length of time and frequency of the applications.

Finally, it teaches to never go against one's best judgment, simply to gratify the importunity of a patient.

SERIES III. ARRESTS, TWENTY-FIVE CASES.

CASE XII.—*Fibro-myoma, pelvic, large size; imperfect application from the twisting and bending of the needles; two operations, both without anesthesia; profound impression; collapse imminent; tumor arrested; general health improved; return of appetite and strength.* Kimball.

Patient, in October, 1876, living in Newton, Mass.; much benefited.

Dr. Kimball's report:

"Having procured from Dr. R. P. Lincoln, of New York, a set of electrolysis needles, prepared under his direction, I selected two of the longest, six inches in length, and about one-sixteenth of an inch in diameter, cylindrical, tipped with platinum, and tapered to a point like a common sewing-needle. The battery was furnished by Dr. Cutter, and with special reference to the purpose in view. Thus provided with what seemed to be in all respects a complete apparatus, I proceeded to make trial of it in the case of Miss F., of Springfield, Mass., aged about 40. It is proper first to state that I had previously been sent for to see this case, in the expectation that I could find an ovarian tumor. I found instead, however, a large fibroid tumor of the uterus of several years' growth, very hard and irregular, filling the pelvic cavity and rising into the abdomen to an extent indicating a seven months' pregnancy. Every symptom, local and general, declared beyond all doubt the true nature of the disease. There had been frequent hemorrhages, and consequently marked anemia and great prostration. The tumor had been rapidly increasing, and the suffering from distention had now become almost unbearable.

"Being informed of the true nature of her disease, and that it was not of a character that, in my judgment, properly admitted of any such operation as she had anticipated, the patient was quite ready and even anxious to submit to any other form of treatment I might suggest. The plan of electrolysis was then fully explained, and in pursuance of arrangements then made, she soon after came to Lowell and submitted to the *first trial* of the battery, the 26th of December, 1871. No anesthetic was used. The electrodes were plunged into the most prominent

part of the tumor, passing through the abdominal walls on either side of the median line, about six inches apart, and in a downward and inward direction. They entered the tumor with great difficulty, and became so twisted and bent in the effort that the fibrous structure was penetrated not more than three-fourths of an inch.

“In this respect, the operation was not at all satisfactory, inasmuch as it was intended that the electrodes should penetrate the tumor to at least the depth of three or four inches. Connections were made between the battery and electrodes, and the unbroken galvanic current maintained continuously for seven minutes. During this time the pulse changed materially as regards frequency. At first it was not disturbed; very soon it rose to 120, and was not so full as natural. The face became pale and somewhat pinched. A cold sweat covered the forehead, and hands and feet, forearms and legs were cold and pale. The patient all the while uttered expressions of much suffering. Finding the impression so very profound, we desisted from farther continuance of it, lest serious harm might ensue. The connections were broken and the electrodes withdrawn. The operation was followed by considerable prostration and a pretty sharp pain through the abdomen. The prostration was met by stimulants, and the pain by subcutaneous injections of morphine and hot fomentations to the abdomen. The patient gradually rallied, and the pain subsided in the course of twenty-four hours. A sense of soreness through the region of the tumor continued for several days.

“January 1st, 1872, *second operation*.—The operation was repeated in the same manner and with very similar results as to prostration and local suffering. For the six weeks following the second and last operation, the patient remained under my daily observation. No special change was noticed as regards the tumor; certainly no increase in size appeared—a fact of great significance, considering that, for weeks previous to submitting to the first application of galvanism, the growth was rapidly advancing and causing great suffering from distention. Defective and unsatisfactory as were the experiments in this case, owing to the imperfect construction of the electrodes, the effect upon the general condition of the patient proved, on the whole, very gratifying. Within three weeks from the first trial of the battery, there began to be a manifest improvement in health. Besides the return of appetite and strength, there was a consciousness of an arrest of the growth of the tumor. The moral effect of the last-named fact was to remove a depressed state of mind that had hitherto been one of the most important features of the case.

Being satisfied that electrolysis had not been fairly tested in the foregoing case, I determined that, before making further trial of it, I would provide myself with better and differently constructed electrodes. With this view, I applied again to my friend Dr. Cutter, whose tact and ingenuity I was sure was quite equal

to furnishing all that could be desired. The first electrode he produced was made after the fashion of a corkscrew. This looked promising enough, but proved upon trial to be perfectly worthless. The doctor then produced another instrument, made almost precisely in the form of a surgeon's director, grooved, with sharp point and edges, and an ebony handle at the proximal end. Provided with this newly devised instrument, I expected to be able to penetrate the fibroid tissue to any depth desired, however dense and unyielding it might be. The angle made by the two laminae of the blade was made dull so as to bring the tissue strongly in contact with the sharp free edges of the laminae, and thus cause their easy severance; moreover, from the instrument possessing so much larger surface on its four planes, it was expected to get a greatly increased galvanic action. In both these respects I have not been disappointed. I can justly recommend the instrument as decidedly superior to any other I have yet seen."

Remarks.—This case has a great interest, as showing the natural history, so to speak, of the operation without anesthesia. The great sufferings manifested by the hippocratic countenance and the signs of profound collapse point to the exhibition of a very profound influence. The fortitude of this patient demonstrated that it is cruel to perform this operation when the subjects are not under anesthetics; the shock is too great.

CASE XIII.—*Pelvic and abdominal fibro-myoma; dyspnea; ascites; anasarca; no anesthesia; effect of galvanism, disappearance of dropsical symptoms; relief from dyspnea; tumor sensibly diminished at least; three operations; return of bad symptoms on ceasing applications; death therefrom.* Case published January 29th, 1874, in *Boston Med. and Surg. Jour.*, page 110. *Operator and Reporter, Kimball.*

"March, 1873, Mrs. T—, widow, Hubbardston, Mass., 40 years of age, married nine years since, but without children, called upon me to get my opinion and advice in regard to a large tumor in the abdomen. On examination, I found the disease to be a uterine fibroid, very dense, irregular, almost completely filling the pelvis, and extending upward into the abdomen as far as the umbilicus. The neck of the uterus was also involved, and the disease in this direction had projected itself several inches into the vagina. The general health of the patient had become much impaired, and she was suffering greatly in many ways, but especially from constant dyspnea and inability to get any rest, except in a semi-recumbent position or sitting upright in a chair. There was more or less peritoneal effusion, also anasarca. Although the case was unpromising, after explaining the difficulties and the slight prospect of getting any relief from any form of medical or surgical treatment, I suggested that *possibly* some benefit might be gained from

galvanism. The proposition was cheerfully accepted, and no time was lost in carrying it into effect."

First operation.—"The first experiment with the battery was made the 26th of March under the direction of Dr. Cutter. His newly-constructed electrodes were then used for the first time. The plan of procedure was precisely the same as that described in the first case, except that in the present instance the electrodes were made to penetrate the tumor to the depth of four inches, instead of less than a single inch, as before. The current was continued five minutes. During this time, the local suffering was quite severe and lasted several hours after the electrodes had been withdrawn. The pulse, meantime, fell from 100 to 60 per minute, and the skin became cool, but there was no severe prostration, as in the former case. Considerable reaction followed, but it subsided entirely in the course of twenty-four hours. The immediate effects of this operation were quite remarkable. During the first twelve hours, the urinary secretion was more than quadrupled in quantity. At first turbid, it became clear and light-colored. In connection with this change, the dropsical condition began immediately to subside, and in less than a week it had disappeared altogether. But the most striking effect of the operation was the almost instantaneous and perfect relief from dyspnea. For the first time in many months, she was permitted to lie down in bed and enjoy rest and sleep equal to that of the healthiest period of her life."

Second operation.—"As soon as the pain and soreness had fully subsided, the patient was subjected to a second trial of the battery. This time the tumor was attacked in a different manner. One electrode was thrust into the disease through the abdominal walls about four inches; the other electrode was made to penetrate the tumor per vaginam. In this direction, it entered about three inches. The connections were then made, and the current continued about four minutes. No specially marked effect followed this operation, save some pain in the direction of the tumor, somewhat severe at first, but subsiding in the course of a few hours."

Third operation.—"The third and last operation was done about two weeks after the second, but with no special difference as to results. This patient was under my charge six weeks, and her general condition was improved greatly. The more special evidence of this fact was seen in the complete and continued relief from a most distressing dyspnea, and at the same time in the ability to lie down and sleep comfortably in her bed. Her appetite and strength returned in a great degree; the peritoneal effusion and anasarca passed away, and the suffering from abdominal distention became scarcely noticeable. The tumor itself became sensibly diminished in size, at least two and a half inches, as determined by careful measurement with a tape passed around the body over the most prominent portion of the tumor. Upon my departure for Europe, the 1st of May, the galvanic

treatment was discontinued, and the patient returned to her home. Soon after, as I have since been informed, her improved condition, so recently giving promise of a permanent relief, began gradually to give way to a return of all the previous bad symptoms. In defiance of medical treatment, her condition soon grew rapidly worse, till, finally, she was relieved by death, about the middle of July, some ten weeks from the time I last saw her."

Remarks.—In calculating the merits of electricity as a remedial or curative agent, I am not disposed to make more of this case than it really deserves. I can only regret that the treatment which during the period of six weeks had produced such marked and satisfactory results could not have been longer continued. There were complications in the case, and it is not quite certain whether they were incidental to or independent of the uterine disease. However this may be, it was certainly an important and interesting fact that they were completely relieved for a time through the influence of galvanic action. As regards what might have been the result of a longer continued application of this same agency, it is, of course, a matter of mere conjecture. But allowing the case to have been absolutely beyond the reach of cure by any known remedy, the power of galvanism in affording such relief from suffering, as shown in this particular instance, furnishes sufficient reason for regarding it as something better than a therapeutic agent of a merely fancied value.

CASE XIV.—*Large fibro-myoma; multilobar; abdominal; ascites; disabled from much employment.*

Result:—*Tumor diminished; dropsy dissipated; improvement in general health; able to keep a boarding-house; subsequent invalidism from peritonitis resulting from careless exposure; dysentery, death and autopsy eleven months after last operation.—Operator, Cutter.*

Mrs. P., a patient of Dr. W. G. Wheeler, of Chelsea, colored, aged 41 years, childless marriage, on March 2d, 1875, presented an enormous multilobar, very dense fibro-myoma. It was of ten years' standing, chiefly abdominal, and somewhat tender. She had ascitic effusion and great distention. The measurement about the largest part of the abdomen was forty-four inches. She suffered at times from attacks of what her physician regarded as peritonitis. These attacks were quite severe, confining her to bed about three days at a time. At other times, the tenderness and weight were productive of much suffering. This day (*ut supra*) in the presence of Drs. Wheeler, Weeks, Shackford, and my-

self, she was etherized and submitted to the application of the battery.

First operation.—Both electrodes were passed through the abdominal walls and the current was continued for five minutes; pulse normal throughout. No collapse or bad symptoms followed. Considerable serous fluid exuded from the punctures. She was kept in bed a short time only. Soon the ascites disappeared, lessening her bulk and distress from distention. It did not reappear until just before her death. She took matters very calmly and heroically, making but little trouble throughout. She had been, it should be stated, unable to perform her household duties to any advantage.

Second operation.—March 27th the second application of the battery was made. She was in good spirits, feeling well, and able to work. Ascites gone. The current was continued ten minutes under ether. Drs. Wheeler and Weeks present. Both electrodes were passed through the abdominal walls. More constitutional disturbance followed this application. There was a marked increased action of the kidneys manifested by the unusual and profuse flow of urine that lasted for some time. She kept improving in health, although the tumor apparently was only arrested. She went through the summer well and through the winter demonstrated the decided improvement in her health by keeping a house full of boarders and doing all the work herself. When approached with reference to a third operation, she said: "I feel well enough and do not see why I should go to bed for two or three days simply to please Dr. Wheeler and Dr. Cutter; and besides I am too busy."

Third operation.—However, on March 4th, 1876, she submitted to the operation again. Six physicians were present. One of them was Dr. Webber, an electrician by specialty. Some of the gentlemen had seen her before and expressed the opinion that the tumor had diminished somewhat in size since the last operation. The electrodes were passed in through the largest lobe on the right side of the abdomen, and the current continued for five minutes. The electrodes were then withdrawn and reintroduced into another lobe on the *right* side and into a lobe on the *left* side of the abdomen. The current was passed through for five minutes. The specialist tested the power of the battery with a large galvanometer and, as expected, found the *quantity* of electricity large and the *intensity* small. Unless the electrodes touched the connecting wires, the galvanometer did not respond. When it did, the large needle, about eight inches in length, went up to 90° and struck the pin placed there. It was a question with him whether the current did really pass through the tumor. Mrs. P. was profoundly impressed with the double application in this operation, but in a few days she was about as well as ever, and as she felt so comfortably well, it was thought best to give her another resting spell. This is the first instance of *four* punctures made at one operation. The result showed a marked

increase in the systemic effects. It is a procedure that should not be practised in any case unless one is sure he is dealing with a good subject, that is, one who has borne the shock well and shown that she is capable of a profound impression without too much constitutional disturbance. It will not answer to be reckless or careless in dealing with such sensitive and vital organs or their diseased conditions as are found within the peritoneal cavity. During the summer of 1876, our patient had an attack of peritonitis similar to those she had had before the interference by electricity. Dr. Wheeler, her physician, stated that the inflammation was situated away from the sites of puncture. He did not regard the electrodes as having caused it. The attack passed away with no bad results, and Mrs. P. continued in the enjoyment of good health up to October 29th, 1876, with the growth of the tumor arrested.

Fourth operation.—On this day, she submitted to the *fourth* application of electricity, which under the circumstances may be called the *historical operation*, as previous to this time no very great notice had been taken of this new procedure.

In June, 1875, two eminent surgeons and gynecologists of New York City expressed a desire to witness the application of electricity to a uterine fibroid by this method. They stated that they would come on especially to see not less than *three* cases collected together at one point. They were summoned by telegraph and they attended to-day. With them came Dr. F. Semeleder, an eminent physician, formerly a professor in Vienna. The names of these gentlemen, Prof. T. G. Thomas and Dr. James B. Hunter, are so well known that they are full guarantees of leadership in their specialties.

Drs. G. H. Bixby, G. W. Gay, Warner, and J. G. Blake, of Boston; Wheeler, Shackford, Fenwick, Weeks, Haskel, and Walker, of Chelsea; Sullivan, of Malden; and Marcy, of Cambridge, met these gentlemen at this operation. They were sufficient to bear witness and to give the occasion the importance it should have in the history of the operation. An attempt was made to have this operation represent the main features of the operations that had preceded it.

1st. The battery, electrodes, and conductors were the same. The exciting fluid was shown and its preparation described. The plates were immersed in the fluid placed in the cell, connections were made, and the electrodes were struck together giving off large sparks with brilliant coruscations and scintillations, proving that the battery was in order and ready for use.

2d. The patient was placed in bed with all her clothing removed except her chemise and night dress. She was then examined by all interested, and all satisfied, by actual examination, of the correctness of the diagnosis, viz., of the character being subperitoneal, dense, and multilobar. The pulse was noted to be normal, the skin to be cool, and the patient otherwise in good health and condition for the operation.

3d. The patient was etherized.

4th. The abdomen was exposed. The electrodes were lubricated by dipping into olive oil. One was then thrust into the lower part of the larger obovoid flattened lobe on the left side of the umbilicus, from below upwards, to the depth of four inches. The lobe was steadied by the hands of Prof. Thomas and attention was particularly called to the resistance which was offered to the penetration and the facility with which the peculiar form of the electrodes overcame the opposing forces. The ease with which the direction of the electrode was controlled and also the certainty of the penetration was shown. There was no twisting, jumping, or sidelong movements that occurred when it was once attempted to introduce the large ordinary platinum-tipped electrolysis needle into a similar fibroid some years ago.

The other electrode was taken in the hand and its method of holding shown—the handle resting in the palm held against the ball of the thumb by the little, ring, and middle fingers of the right hand, the free edges of the laminae being placed upwards, the index finger pressing against the outer side of the blade of the electrode at about its middle, the point of the thumb also pressing against the upper surface of the flattened proximal end of the blade—this disposition of the parts of the hand giving a perfect control of the instrument. The tumor was steadied by the operator's left hand, and the second electrode was slowly and continuously driven from above downwards into the lobe, approaching but not touching the other electrode. The depth of penetration was four inches, so that the insulated portion of the electrode came within the skin.

5th. One gentleman watched the pulse; another took charge of a watch. The conductors—in this case made of strands of fine silver wire as chemically pure as it could be made—were attached to the electrodes simply by running their ends through the fenestræ at the end of the electrodes and bending them about it. As the second conductor was attached, attention was called to the convulsive starts and contractions of the abdominal muscles as evidence demonstrating the passage of a current. While the current was passing, some remarks were made as to the *modus operandi* of the electricity. The attempt was made to explain what was done by showing *how* it was done. It was said: "Gentlemen, here you see the battery, the conductors, the electrodes, the patient, the method of introduction of the electrodes, their connection with the battery; and the results that have followed you shall know at some future time. You are to judge whether these results have been effected by these causes. We know that galvanism is a powerful agent, and we know its nature only by what it does. You will please examine the electrodes and you perceive no evidence of a thermic effect" (this was done satisfactorily) "There is no shock, for you saw me touch the electrodes to my own and your persons without the evidence of any sensible im-

pression. The sparks struck forth from the lightly and quickly touched surfaces of the electrodes, and the convulsive movements of the abdominal muscles prove the existence of a current. We think, too, that there is something more done than by mere punctures alone, and that they would not be tolerated as they are unless accompanied by galvanism. We have no objection to, and desire that any one who thinks that our results have been attained by puncture alone, should at once perform a series of operations like these, but without galvanism. It would be a great thing to get rid of the cumbersome battery and the nasty, dangerous, exciting fluid. But with our experience and successful results, we do not dare or feel called upon to turn aside from the path our explorations have made at the bidding of any one who has not had the practical, experimental experience we have been permitted to acquire. And then as to battery, we do not say that the one used is the best or the most suitable. If we felt convinced that another one would accomplish the same results, we would not hesitate to use it. The present one was devised and employed because at the time it appeared to us to be the best, and the lapse of nearly five years " (now fifteen years) " having shown that it performs so much better than our most sanguine hopes and highest expectations, we do not feel, to use a common expression, like 'speaking ill of the bridge that carried us over.' And before we give up the present battery we must be convinced, by a series of practical trials made upon similar cases by those who feel convinced their battery is so much better than ours. Surely it is asking too much of us to require that we must institute a new series of experiments in which human life is so much at stake, because some person who has never performed the operation and, of course, has had no such practical experience as we have been permitted to acquire, comes forward and demands it. The thing is simply a matter of history. It is a relation of what has been done, not a question of what might be done. We say as a fact that uterine fibroids have been dissipated, diminished, arrested, and some not at all affected by pursuing the procedure which we have endeavored here to-day to give you a practical example of. We have concealed nothing. We have nothing to conceal. We offer this as our contribution to the treatment of subserous uterine fibroids which hitherto have defied treatment." During these remarks, the condition of the patient was watched, and as long as there were no symptoms of systemic disturbance the current was continued until ten (10) minutes had elapsed. The electrodes were then withdrawn. Attention was called to the need of placing two fingers close to the point of entrance, and holding the tissues in contact with the tumor as the instrument is withdrawn.

Reference was also made to the ease with which the *zinc* electrode was withdrawn and the sticky adhesive contact of the *carbon* electrode as evincing the passage of a current. If there was no chemical action, there would have been no difference between them. Attention also was called to the blackened and granular

condition of the electrodes, as demonstrating the passage of a current. Steel instruments, when placed in contact with living tissues, do not become changed in appearance like this unless associated with a galvanic current.

As the patient was apparently not much affected by the application, the operation was immediately repeated, by plunging one electrode into the large lobe lying to the left of the navel, in a direction towards the centre of the body to a depth of four inches. The other electrode was passed into a smaller lobe on the right side of the abdomen to the same depth. The current was continued for six minutes, until the patient began to look pale, become restless and move about. The pulse was accelerated. The gentlemen were invited to notice these symptoms as indications of the extent to which the applications should be carried. Prof. Thomas, at the request of the operator, withdrew the electrodes, and by his own subjective sensations observed the different degrees of resistance with which they were removed. They were then touched together and large sparks were struck forth, as indicating the amount of current existing at the close of the operation. The patient was allowed to come out of the ether, warm applications were applied to the abdomen, and the operation was declared completed. The gentlemen expressed themselves as satisfied with the clearness and fulness of the demonstration.

October 31st. Mrs. P. was found feeling prostrated, looking pale, bowels tender and sore, pulse good, still she was up and dressed, sitting in a rocking chair by an open window. The window was closed and she was cautioned by telling her that everything bad that should now befall her would be charged to the operation, and she must not bring any discredit by carelessness. She, November 4th, was seen just in the act of sitting down to a fish dinner she had herself cooked. Appetite good. December 12th. Mrs. P. recovered well from the operation, and also did well until she moved her residence to another quarter of the city. She took cold in the moving and injured herself by lifting. She had some fever, pain and tenderness of the belly, constipation, loss of sleep and appetite. Her physician prescribed a castor oil purge, and morphia solution afterwards. The larger lobe on the left of umbilicus felt boggy and soft, as if it was undergoing an interstitial change to a cystic condition. No wave could be felt.

December 29th. Suffering considerably with vomiting and diarrhea, fever, some delirium, belly tender and sore; less boggy; confined to bed; pulse good. It seems now that the patient went to a funeral and stood on the frozen ground during the burial services and *took her cold there*.

1877, Jan. 4th. Reported better, but unable to be about the house.

January 17th. Much troubled with pain shooting down the thigh of the right side. Confined to bed.

February 8th. Better.

March 28th. Very much better. Measured $41\frac{1}{2}$ inches largest

circumference. Her clothes have become at least six inches looser than they were. She is ready to take boarders.

September 18th. Received intelligence from Dr. Wheeler that Mrs. P. died on the 16th. That she had an attack of dysentery four weeks ago. This was checked so that she was quite comfortable. An attack of peritonitis followed, and she died from exhaustion.

Autopsy. Body much emaciated. Abdomen very prominent. The peritoneum was found very adherent throughout. Oij. of ascitic fluid was sponged out. The fibroids were agglomerated into one irregular mass of a grayish-white color, mottled, in some parts of the color of beef steak dotted with points of white. The whole appeared like a lump of tallow. The lobes were joined together as if set in cement. The density and toughness of the adhesion showed a long continuance of the inflammation. On dissecting off the abdominal walls and intestines from the fibroids, they were found to spring from the uterus, which was lost in the general mass. It appeared as a cylinder one inch in diameter; depth of cavity five inches. To the right of the uterus was a large lobe that pointed downwards into the cavity of the pelvis; in its centre was a cavity as large as a walnut filled with pus. An attempt was made to connect this cavity with the electrodes as a cause; but from its great depth this was decided to be impossible. Above this lobe, on the right, was an irregular lobe two and one-half inches in diameter, semi-solid, not entirely purulent, penetrated by an irregular opening large enough to admit the forefinger. This might have been due to the electrode. The largest lobe was cut open in its long diameter. It displayed a uniform surface, white and cartilaginous. There was no mark of the tracks of the electrodes that had repeatedly penetrated the growth. The evidences of general peritonitis were very much marked. Coagulated lymph, partly organized, plastered over the tumors and the intestines. Portions of the large intestines were almost black and gangrenous.

Kidneys, liver, and spleen healthy.

When the fibroid mass was separated it weighed twelve and three-quarter pounds.

There was one fibroid as large as a hen's egg attached to the abdominal walls at the right hypogastrium. It was white and lardaceous, entirely free from and unconnected with the other lobes. The fluid, with difficulty scraped from the cut surfaces of the lobes, showed under the microscope curling connective fibres, red blood-globules, large parent cells, other cells of varying sizes, innumerable granules, most of them swarming with independent molecular motions.

From the density, the varying histological elements, and the macroscopy, the writer is inclined to regard the degeneration as probably cancerous.

The mobility of the fibroid lobes upon one another remained

until some time after the last operation. The history is not that of direct death from the punctures.

Remarks.—This patient, like some others, was careless. It is unfortunate for those desiring to study the natural history of this operation to have it interfered with by influences of ill independent of the procedure. Sitting by an open window, moving, and attending a burial at the grave in cold, inclement weather, are more than most healthy women can bear without sickness, much less this profoundly galvanized one.

CASE XV.—*Large fibro-myoma, sub-peritoneal. At first relief from painful micturition followed the galvanism, with a partial diminution of the growth. Hemorrhages not checked. Death therefrom about eighteen months after the first operation. Operator, Kimball.*

“Miss C., of Newburyport, a domestic, twenty-four years of age, never married, a naturally stout, healthy person; first noticed that she was growing unusually large about four years since, '69. She came to consult me about the middle of September, 1873. Her case was readily diagnosticated as a fibroid uterine tumor, occupying a great portion of the pelvic cavity and extending into the abdomen about three inches above the umbilicus. Her general health was not much disturbed. She was able to go through her daily duties as a domestic without much difficulty. Her chief trouble was a constant pressure against the bladder, causing frequent and painful micturition.

In view of what I had so recently seen accomplished by electrolysis, I proposed a trial of it in this case.”

First operation.—“In the course of a few days she came to Lowell for treatment, and, with the assistance of Dr. Cutter, galvanism was applied for the first time September 22d, Drs. Graves and Fuller being also present.

“The electrodes were thrust into the tumor at two points six inches apart, to the depth of four inches on either side, as in previous cases, and the galvanic current maintained *five* minutes. At the commencement of the operation the pulse was 85; at the close it had fallen to 54, the patient meantime being under the influence of chloroform. Returning to consciousness, she complained of severe pain through the abdomen; it continued more or less severe for several hours, but left her almost entirely in the course of the following day. For nearly a week, pressure upon the tumor gave pain.”

Three other operations.—“The operation was repeated in the same manner three times in three weeks. She then returned home, remarking, as she was adjusting her dress, that she ‘was sure her tumor was smaller because her clothes seemed much looser about her.’ Upon a return of her menstrual period, which was within a week after leaving my charge, she noticed the dis-

charge was unusually abundant. It continued so long and so profuse that her physician, Dr. Howe, was called in. Under his treatment the hemorrhage gradually abated, and in the course of three weeks ceased altogether. A few days later she returned to Lowell for further trial of electrolysis. During her absence there was but a slight change in the size of the tumor, especially the upper or abdominal portion of it; that it had diminished somewhat in the pelvic direction seemed evident from the fact that ever since the completion of the first series of operations she had been perfectly relieved as to the pressure on the bladder and the almost constant desire for micturition which previously had been so annoying."

Fifth operation.—"The fifth application of galvanism was made the 20th of November. A day or two afterward she menstruated naturally, and on the 27th, a week from the previous operation,"

Sixth operation.—"Galvanism was repeated."

"She returned home, and no more essays were attempted, and, a year after, death occurred from hemorrhages which were uncontrollable. The tumor did not increase in size."

CASE XVI.—*Large fibromyoid, patient bedridden for nine weeks. Tumor diminished one-third from one application and she was able to be up and about the house. In a week's time, rode out in a carriage comfortably and went about the town as well as ever she did. Two years afterwards the tumor returned to its former size, but the patient continued in good health. Operator, Kimball.*

Mrs. D., of Marlboro, Mass., Oct. 15th, 1873, states that she is 38 years of age and has two children, that at the birth of last child she discovered a lump in the lower part of the abdomen. That ever since that time she has been troubled with more or less occasional hemorrhage from the vagina, and especially at her menstrual periods. At these times she suffered not only from this hemorrhage, but also from continual pain and for the last nine weeks has been almost confined to bed.

On examination, it was evident that she had a fibroid interstitial enlargement of the uterus. This was manifested both through the abdominal walls and through the vagina. The case was judged a proper one for the use of galvanism, and with the concurrent advice of Dr. Charles Putnam, the attending physician, the remedy was applied Nov. 1st, 1873.

First operation.—Chloroform was used as an anesthetic, the electrodes were passed through the abdominal parietes on either side at a point midway between the umbilicus and the anterior superior spinous process of the ilium. They penetrated the fibroid about three inches each. Current continued for five minutes. Recovering from the chloroform she felt no suffering, nor was there any evidence that the system generally had been disturbed.

Second operation.—On the 17th of December following, a second application of the battery was made. Meantime the patient had experienced a great change for the better. *Tumor diminished one-third and decidedly softer.* No excessive uterine hemorrhage. Instead of being confined to the bed almost all day, as before, she is now able to be about the house. In a week's time she rode out in a carriage comfortably and went about the town as well as ever she did.

Third operation.—February, 1874, galvanism for the third time was used. General health good. Tumor still diminishing. An unusual effect of the battery was noticed at this operation, namely, a sudden gush of blood from the uterus. It lasted only for a few minutes, when it ceased altogether. Two years afterwards the tumor returned to its former size, but the patient was in a good state of health and remained so at last accounts.

1886, Dec. 15th. Report from this case is, the tumor has not increased since treatment, and it is thought if she had been able to stand another operation she would have been entirely cured.

CASE XVII.—*Proved to be malignant. Tumor at first very solid, afterwards turned soft and fluid. Menorrhagia and flowing checked. Operator, Kimball.*

Miss D., of Fisherville, N. H., 43 years of age, had a fibroid tumor of the uterus of long standing. The growth was very solid and quite prominent, giving the idea, as to size, of a six months' pregnancy. Examined per vaginam, the tumor was found projected downwards, filling up the vagina and pelvis, so that the neck of the uterus was not to be reached. Besides it pressed directly against the bladder, so that, as the finger passed behind the pubis, it was arrested at once in a cul-de-sac. Posteriorly the finger swept around a large globular tumor apparently about five inches in diameter. No cul-de-sac could be reached in this direction. The local and constitutional effects on the patient were very serious, locally interfering with the natural functions of the bladder, causing constant uneasiness and desire to micturate, and constitutionally producing exhaustion by the frequent and continuous hemorrhages, though they were not excessive at the menstrual epochs. She was unable to make much bodily effort. Electrolysis was advised and accepted without hesitation.

First operation.—February 18th, 1874. She was placed under chloroform and the electrodes were introduced in the usual way, deep into the tumor. Current continued ten minutes. No pain followed. Some slight vaginal hemorrhage appeared. It was thought to be menstrual, but out of season. Two days afterward the tumor seemed soft, as if containing fluid. It was punctured with a small trocar. Bloody serum exuded.

Second operation.—A week after the first, there was a second

trial of the battery. Next day a rather profuse hemorrhage occurred. It soon ceased, but returned upon getting out of bed and walking about. There was loss of appetite and loss of strength. In the course of a week, hemorrhage recurred several times. She left my charge in Lowell in April and returned to Concord, N. H. Hemorrhage never came back, but prostration and want of appetite continued. About April 20th appeared a discharge of fetid matter which caused some anxiety to patient and friends. I visited her on the 23d. Tumor the same in size, but seemingly more soft. Made a puncture with a small trocar and the same bloody serum exuded as before, excepting that it contained pus-globules to some extent. The discharge was evidently from the uterine cavity. This case afterwards proved to be malignant on a post-mortem examination. Death ensued from prostration.

CASE XVIII.—*Large multilobar of six years' standing. Ascites and anasarca. Excessive metrorrhagia. One application of galvanism for five minutes. Next day dropsies had disappeared. Four more applications. Tumor sensibly reduced. General health improved. Operator, Kimball.*

Mrs. C. B., residence Bridgewater, Mass., 53 years of age. Married for several years. No children. Had tumor in abdomen for five or six years previous to 1874. On examination, it proves to be a fibroid consisting of several lobes movable on each other and of various sizes. She has been suffering greatly from uterine hemorrhage of late to an alarming degree. It is attended with a dropsical state of the lower limbs and more or less of ascites.

First operation.—On the 15th of October, 1874, she submitted to galvanism. The electrodes were thrust into two distinct lobes. The current was continued for five minutes. Effect not marked except as to soreness of the regions where electrodes penetrated the interior of the diseased masses. Depth of penetration three inches.

Next day after the operation the *swelling of the limbs entirely disappeared; so also the ascitic effusion was dissipated.* Patient able to lie down and sleep comfortably, a circumstance that was very gratifying, seeing that for many months hitherto she had suffered great discomfort while lying in a recumbent posture. These results were considered sufficient for the time and the treatment was discontinued. After an absence of more than five months she returned to Lowell for further galvanic treatment. Size of tumor not changed—not increased—it was arrested. General health improved.

Second operation.—May 28th. Galvanism. One electrode was passed into the uterus per vaginam. The other electrode was passed through the abdominal parietes. Though followed by prostration, the operation was well borne.

Three more operations.—Three more applications were made at intervals of three days each. She is satisfied that tumor has lessened somewhat in bulk, because she is relieved from the down-

ward pressure which has troubled her very much heretofore. Physical examination confirmed her opinion.

Remarks.—In this case the result was regarded as quite favorable, inasmuch as there was an arrest and diminution of the tumor. The experience with the anasarca and ascites tallies with other cases and goes to suggest the idea that the galvanic current may be one of the promptest means of relieving dropsical effusions which are associated with uterine fibroids, and possibly those cases that are without uterine complication. In no case of the present series with ascitic complication has galvanism failed to carry it off. It is hoped that further experiment may be made in this direction.

CASE XIX.—*Large interstitial fibroid; sensibly diminished under galvanism; in progress; still a patient; general health decidedly better.* Operator, Kimball.

Mrs. R., of Lancaster, Mass.; 40 years of age; has no children, though married for several years. She is a healthy woman except for a uterine fibroid which has been existing, so far as she can calculate, for five years or more. Menstruation natural. She has not been inconvenienced by the disease till within a few months. Now she feels that it is seriously affecting her general health, especially in regard to her ability to pursue her ordinary household duties. Size of tumor, abdominal portion, five inches in diameter. The shape is irregular.

First operation.—On the 10th of November, 1874, the battery was applied at Lowell Hospital, in the usual manner. No unpleasant effects followed, except a sense of nervous prostration. She returned home after this, and subsequently she came back again for a *second series* of applications. When these were completed, she again went home and remained until March 27th, 1875.

Third operation.—On this date galvanism was applied the third time. It was well borne. Tumor sensibly diminished. General health decidedly improved. 1887, housekeeping and doing her work.

CASE XX.—*Enormous growth; cervix uteri nodular; disabled; excessive and frequent metrorrhagias; patient losing ground; effect of eight applications in eight months, reduction of tumor one-half; nodules removed; hemorrhages stopped; general health restored.* Operator, Kimball.

Miss F., of Newburyport, Dr. Howe's patient, came under my charge for treatment in November, 1874. She presented a fibroid tumor of the uterus of very large growth, filling and distending the abdomen to a great degree. The cervix uteri was nodular. The tumor had been growing for at least six years, and probably for a longer time. She has been able to discharge the duties of house servant till within the last few weeks. She is

now quite disabled in this respect, and has given up all employment requiring bodily activity. Age 38. Never married. Greatest difficulty metrorrhagia, which is frequent and excessive, having no periodical relation to menstruation. She is now in very feeble health, a good deal emaciated, and feels that she is rapidly losing ground.

First operation.—Galvanism was applied in the usual manner. The effect was marked by no special disturbance, local or general, except perhaps a sense of prostration. Appetite good. Sleeps well. Pulse natural.

Second operation.—Forty-eight hours after the first application, the battery was again applied. The effect was the same, only that the prostration seemed greater. Swelling of the right lower limb came on in the course of twenty-four hours after the operation, attended with severe pain.

Six more operations.—Between the 22d of May and the 5th of June, 1875, galvanism was applied six times. The third time there was a free bleeding from one of the punctures, but no harm resulted from it. Four times an electrode was passed per vaginam into the projecting portion of the fibroid as found occupying the upper part. The effect of these applications was to directly diminish the growth one-half in size. The nodular condition of the cervix uteri was removed. The profuse metrorrhagias stopped; the malaise was relieved. Patient has reported in person within six months that she was very well indeed. Tumor still diminished. The result in this case was marked enough to be palpable to all. The relation of cause to effect was so close that it cannot be a mistaken view that regards the electrolysis as of great therapeutic value.

CASE XXI.—Small fibroid; marked relief; able to stoop, bend forward, and tie her shoes, also to sit erect in her chair; all which she could not do before; tumor diminished. Operator, Kimball.

Mrs. W., of Portsmouth, N. H., widow, 50 years of age, had one child 28 years old; she is not of vigorous constitution. Twenty years ago she had typhoid fever, and more recently some pulmonary difficulty which led her physician to suppose her case hopeless as to recovery. Several years ago it was discovered that she had some unnatural growth in the pelvic region. Examined by her physician, her difficulty was declared to consist in a fibroid enlargement or tumor connected with the uterus. The size was not greater than a large orange; shape irregular. It was easily moved from side to side of the pelvic cavity. A portion of the tumor, or perhaps a separate and distinct mass of the same character "fibroid," was felt pressing back upon the rectum. Notwithstanding the small size of the tumor or tumors, the inconvenience to the patient has been very great, so much so that she has found it very difficult to fulfil the ordinary duties of her household, not so much on account of pain, as of a sense

of "pressing down," preventing her from stooping or bending forward.

First two operations.—Early in January, 1875, she came under my charge for treatment, and galvanism was applied in the usual manner. The effect was very slight as regards its impression on the general system. No variation of pulse or other functional disturbance followed.

Third operation.—On January 23d, 1875, operated for the third time. One electrode was entered into the enlarged neck of the uterus per vaginam, the other into the solid mass above the pubis. Current was continued for five minutes; she went home. March 27th, she returned for further trial of electricity, and reports favorably of her condition; whereas formerly she was unable to stoop or bend forward, and whereas she was obliged when sitting to bring her pelvis forward with shoulders laid back against the back of the chair she was occupying, she can now stoop and sit comfortably in an upright position. For the space of two years she had been unable to walk any considerable distance, *now* she walks easily without suffering. Health generally is much improved. Tumor but little lessened in size.

Fourth operation.—Electrolysis for fourth time on the 28th of March, 1875. The electrodes were introduced as on January 23d, per vaginam and per abdominal parietes. She came out from the effects of the operation well and suffered none in consequence. The tumor was diminished.

CASE XXII.—*Small tumor increasing; sensibly diminished by galvanism; afterwards it increased.* Operator, Kimball.

1874, December 1st, Miss ———, 34 years of age, has been aware of the existence of a fibroid tumor in the abdomen for about two years, the fact having been brought to her notice by her attending physician. At first its growth was slow; within the past six months its increase has been much more rapid and attended with considerable discomfort. At present the size of the tumor is about the same as that of an infant's head at birth. It is very hard and quite movable. Attempting to make a vaginal examination, it was found that there was a complete occlusion of the vagina. An extremely small aperture, however, allows of the escape of the menstrual discharge which occurs at regular monthly periods. General condition healthy. Rather small in stature, dark complexion.

First operation.—On December 3d, the battery was applied through the abdominal walls. The electrodes were passed into the tumor two inches deep on either side. The immediate effect was not marked. The pulse was not disturbed. The surface of the body maintained at the usual warmth. On awaking from the effects of the chloroform, she expressed no suffering; four hours after operation, she complained of soreness across the upper part of chest, especially in the act of taking a full breath, seeming, the patient remarked, "like an attack of pleurisy."

This was on account of a pain at a particular point in her right side. The pulse was not disturbed and there was no feverishness.

December 5th. Second operation.—Current was continued for six minutes. No marked effect on pulse or other function. Twenty-four hours after operation says she feels as well as ever. The opening of the hymen at this time was enlarged with a bistoury, and still further by the finger.

December 30th. Third operation.—December 31st, slept pretty well through the night and feels well this morning. Treatment suspended.

Fourth operation.—1875, April 16th, submitted to another operation of the battery, inasmuch as the size of the tumor was not materially diminished since last operation. General health improved.

Fifth operation.—May, 1875, there was another trial of galvanism. Both electrodes passed through the tumor. No marked change since last operation.

Sixth operation.—June 16th, 1875, galvanism was repeated; one electrode passed per vaginam; tumor sensibly diminished; operations suspended. At the last report it had increased in size again. General health good. 1887, same report.

CASE XXIII.—Large fibro-cystic reduced one-half by electricity; relieved, but not wholly. Operator, Kimball.

Mrs. S., residing in Lynn, Jefferson Co., N. Y., the 4th of June, 1875, came to Lowell accompanied by her physician, Dr. W. W. Jewett, of Chaumont, N. Y. She was 48 years old. Had several children; the youngest 14 years of age. She aborted once about five years ago. General health is pretty good. She does not suffer much from hemorrhage. It never has existed to a very excessive degree, and consequently she has never been much weakened thereby. Examination demonstrated the existence of a lobulated fibrous tumor of the uterus, extending downward into the pelvis. The growths were gradually increasing in bulk; one-third during the past six months.

First operation.—Electrolysis was employed this day. One electrode was introduced into the uterus per vaginam; the other was introduced through the abdominal parietes.

June 6th. Second operation.—Both electrodes were passed through abdominal parietes. This procedure was followed by some pain, which soon passed away. She afterwards returned home with her physician, a battery, and electrodes; he was instructed how to use them.

Eleven more operations.—His report, Dec. 14th, 1875, was as follows: "She has had electricity eleven times. The tumor was reduced one-half in size, and her health very much improved. The ninth operation caused a leakage of serum. At the next operation I used an aspirator, and removed sixteen ounces of fluid from the upper part of the tumor; before removing the first

quantity of fluid she was very much bloated, felt very uncomfortable, and some sharp pain. The tumor seemed to float about very easily. There is very little difference in the condition of the attachment to the neck of the womb. The kidneys do not secrete their proper amount of urine. She is taking diuretics with very little effect."

Nov. 29th, 1886. Letter from Dr. Jewett.

"Mrs. Spicer was benefited by her treatment for the first three months. Tumor smaller, then enlarged; filled with serum; aspirated at least two quarts, then hardened and increased in size; was removed by Dr. Kimball; weighing about twenty pounds, with a number of deposits of pus. She lived about thirty-six hours; the tumor was removed together with the uterus."

Remarks.—The occurrence of a fibro-cyst is not uncommon; it is, however, unusual for the galvanism to act as a diuretic. Softening of the fibroid is sometimes seen spontaneously occurring, and it is the most rational event to be expected when interference is made with galvanism.

CASE XXIV.—*Large tumor; metrorrhagia; obstinate; remarkable reduction after the lapse of two years.* Operator, Kimball.

Miss E., of West Hanover, Mass., in April, 1873, consulted the writer on account of a large fibroid tumor of the uterus. She was 43 years of age; never married. From excessive hemorrhages, added to constant anxiety of mind, she had become much exhausted, and her constitution was decidedly becoming much impaired. She had undergone much treatment, general and local, in vain. I then advised electrolysis, but she chose to wait awhile. Soon after my return from Europe she called on me again; her condition was the same as when I last saw her, except a slight increase in the size of the tumor.

First operation.—After many misgivings and doubts, she finally determined to submit to the operation of galvanism, but it was not until early in February, 1874, that she was chloroformed and the electrodes were passed deep into the tumor on either side of the median line just below the umbilicus; the current was maintained five minutes. No ill effects—that is, no suffering of any kind—followed the operation. A little soreness was felt for a few days through the region of the tumor, and nothing more.

Second operation.—Seeing no perceptible results from the operation, a second trial was made February 17th, 1874. The electrodes were entered into the tumor to the same depth, but at different places; the current was continued ten minutes. The effect was more marked; more prostration and more local pain and soreness; also a slight discharge of a catamenial character, quickly changing to one of bloody serum.

More operations.—Several operations followed these essays, apparently without result, and the patient was discouraged and dis-

satisfied; however, it seemed that time was an important element in her case, as will be judged from the following letter.

ABINGTON, MASS., Sept. 13th, 1876.

Dr. Kimball.

"I wish to write a few lines to inform you of my improved condition. When I last wrote you, on July 1st, 1876, I was very much debilitated and suffering in a way that seemed to imply that my case was a poor one, and that I was worse in every way. Since that time my general health has been gradually improving, and for the last six weeks the size of the tumor has very remarkably diminished. It is very sudden and unexpected to me, but so certain has the decrease been that I could not forbear telling you of it. I hope to see you some time not far off in the future, and that you may be able to believe with me that the change is greatly for the better. . . . I remain, very thankfully yours, R—."

Remarks.—This case shows that speedy results are not to be seen in all cases; indeed, when the dense and tough texture of uterine fibroids is considered, it would naturally be expected that one would have to wait a long time for the disappearance of the growths after an impression had been made upon them by some external force. Perhaps a more desponding, trustless, and sensitive patient never presented herself with a fibroid, and the pleasantness of the result is heightened by this fact. None should say that *no* result had been attained by this operation unless two years at least have elapsed.

1886, Dec. 12th. This patient writes from Abington, Mass., "It is not entirely removed, but gives me no serious trouble. Am not strong, but general health good."

CASE XXV.—*Proved to be malignant. . . . Very hard, lobed tumor, with irregular surface; softening and enlargement; use of percutan galvanism with some benefit. Operators, Kimball and Cutter.*

Mrs. L., residing in Woburn, aged 38 years, married for a few years only, with no children, noticed an enlargement in abdomen three or four years ago. She has metrorrhagia, which has blanched her somewhat. Naturally a brunette, she presented a peculiar appearance. An examination showed her disease to be abdominal and pelvic fibroid, very hard, lobed and irregular surfaces.

In June, 1875, she was operated upon with the battery several times. There was no relief or marked effect except vomiting and terrible suffering in the abdomen. Afterwards the tumor proved to be malignant. The patient was living in a miserable state at last accounts.

1877, March 28th. Condition terrible. In very great and con-

stant pain in the abdomen, relieved only by large doses of morphia. Vomits a frothy matter constantly. In bed mostly. Appearance bad. Countenance yellow and cachectic. Says tumor is not increased in size. Still is very large, multilobar. *Softened and fluctuating*. When operated upon it was hard and gritty. No metrorrhagia. Measures thirty-six inches around the most prominent part of the abdomen.

April 3d. The writer, judging from Miss C.'s case, thought that the percutan method might possibly benefit her, because now the tumor had metamorphosed from a solid to a cystic or semi-solid state. With Dr. Kimball's knowledge and consent, she was supplied with a carbon and zinc battery, ten pairs of plates six by one inch, one-fourth and one-eighth inch thick respectively. Same fluid as employed with the large battery. The elements were arranged on my own plan. The combination, when excited, decomposed water readily, but did not produce pain or escharosis. She was instructed to employ it three hours daily. Copper discs, one and one-half inches in diameter and one-eighth inch thick, constituted the electrodes. Advised St. Leon's spring water for constipation.

April 12th. Has faithfully used the battery. Measurement, thirty-two and one-eighth inches. Pain in bowels very much abated. Morphia disused. Tumor harder, denser, and smaller. Has pain in feet and limbs. Ankles and the left wrist and elbow swelled. Bowels constipated. Ordered cotton packs and lemon juice.

27th. Has vomited but once or twice since the battery was applied. Before it was constant and distressing. Measurement thirty inches. Lies mostly in bed. Feels well except the rheumatism.

May 5th. Looking better. Thirty inches. Uses battery two hours daily. Drs. W. S. Brown, of Stoneham, and J. M. Moore, of Woburn, examined the case. Both thought it hopeless. Pelvis was found well filled with the fibroid. Fluctuation and tilting on pressing the abdomen.

May 13th. Measurement thirty-one inches. Bowels quite resonant on percussion. Severe chills at night. Been out of doors. Husband thinks she is not better.

22d. Thirty-one inches. Suffers from the east winds. Bowels acted upon favorably by the St. Leon's spring water. Animal food disgusts her.

30th. Ankles swelled. Abdomen the same. No return of the pain. Some vomiting.

July 10th. Thirty-one inches. Confined to bed. Diarrhea. Mouth sore. Tongue clean. Has daily very severe paroxysms of chills and suffers in them so that she appears *moribund*. Pain not returned to abdomen.

August. Discouraged and gave up treatment.

September. Improved.

October 2d. She died. No autopsy.

CASE XXVI.—*Tumor arrested; able to stand or walk without pain, which were impossible before operation; arrest of tumor continuing about two years, when it increased again; in progress. Operator, Kimball.*

Miss C., of Stonham, age 40. Tumor eight inches in diameter. Very hard. Has existed for three years previous to January, 1875. Menses irregular, causing much suffering, besides uncomfortable feelings. Menstrual intervals are two or three months. It puts her in pain to walk or stand.

Three operations.—At the time noted above, she submitted to three operations. They were well borne and the growth of the tumor was arrested for about two years. Meantime she had removed to a distant part of the country, rendering the application of galvanism so difficult as to prevent its use.

December, 1876. She reports herself mainly as follows: "General health and appetite good. Quite fleshy. In respect to taking exercise is much better. Is able to walk quite often to and from (six miles) the city of Cincinnati and while there she goes about on foot, but comes home tired out. At home she sits and sews. Food troubles her by fermenting in the stomach and a decent meal renders her uncomfortable." She adds: "I think the treatment helped me, but do not think the tumor diminished." Another communication, recently received, states that she contemplates further treatment.

June, 1877. She reported as being quite well, but no diminution of the tumor.

CASE XXVII.—*Fibro-cystic and ovarian; large abscess; many operations; arrest of development; ascites; peritonitis; operations remarkably well borne under the circumstances. Operator, Kimball.*

Mrs. —, of —, aged about 35 years. Married for several years, no children; in June, 1874, came under my observation and treatment. She had been under the care of Dr. Atlee, of Philadelphia, for a fibroid uterine tumor and was sent by him to make a trial of galvanism. She was suffering not only from a very large interstitial uterine growth, but also from ascites, for which she had been often tapped, besides a large abscess in the abdominal walls, situated mainly in the median line half way between the navel and the pubis. This abscess discharged a saucerful of matter daily and evidently it was unconnected with the peritoneal cavity (an error). The case was not at all promising for treatment of any kind, and no assurance of any considerable benefit was given as to the effect of galvanism which she had come purposely to try. Before submitting to the battery, she was tapped and about ten quarts of fluid were drawn away.

First operation.—*Next day*, the battery was applied. The electrodes penetrated the tumor three inches and were allowed to remain ten minutes. No unpleasant effect resulted and next day the patient felt comfortable in all respects.

Three days afterwards, the battery was applied for the *second* time. Results the same and no appreciable effect from either operation. Went to — and after an absence of several weeks returned to Lowell and *was again operated upon*.

In July went to Nantucket and remained there through the summer. Came to Lowell again in September, when galvanism was applied through *abdominal walls* as before. The *day* after this application of the battery, she returned home. Number of operations *five in all*. The absolute effect was difficult to estimate. "The patient declared that she feels confident the symptoms generally much improved. Tumor arrested—not lessened nor increased." It is worthy of remark that the menstrual function was very regular from the beginning of the disease. The galvanism was applied by Dr. Paddock after her return to Pittsfield.

The following is her subsequent history as given to the writer in a letter written by the physician in question.

December 16th, 1876. . . . "After returning from Lowell in September, she continued to be in about the same state through the winter. Electrolysis was performed November 30th, December 4th, 18th, and 29th, at each operation much serum escaping from the punctures made by the electrodes. Once quite a quantity of gelatinous substance oozed from the punctures. Electrolysis was not done after the 29th. During the winter, there was a profuse discharge constantly occurring from the fistulæ at the umbilicus of serum and sero-purulent matter. This refers to the parietal abscess. She was able to be out of the bed nearly every day throughout the winter. The size of the abdomen continued about the same. Toward spring she became weak, very much emaciated, and despondent. About the 20th of April, 1875, she was moved a short distance from her own home to her mother's, hoping that the change would cheer her up a little. On the 23d of April, she began to have diarrhea which continued for several days. Her pulse increased in rapidity and became very weak. Her facial expression was sunken and anxious. Her stomach was very irritable and nearly everything taken was vomited. In fact the symptoms of peritonitis increased in severity from this date to May 1st, when she very suddenly expired. The post-mortem examination, in which I was assisted by Dr. J. F. Adams, was made a few hours after death. The intestines occupied the upper part of the abdomen. The fistulous opening at the umbilicus was found to communicate directly with that portion of the peritoneal cavity not obliterated which contained the intestine. In a fold of the small intestine was found a recent perforation from which the contents of the intestine oozed. The anterior portion of the abdomen below was filled with a mass of gelatinous cysts, with here and there a small cyst filled with serum. Behind this mass was the uterus, about the size of a uterus at the the fourth month of pregnancy. Just behind the uterus was the large intestine passing directly up to the upper part of the abdomen. Behind this

and occupying all the posterior portion of the abdomen, extending from low down in the pelvis to the liver and from the extreme left to the extreme right of the abdominal cavity was an immense cyst filled with straw-colored serum, in quantity between sixteen and seventeen quarts. Between these cysts—the gelatinous in front and the serous behind—the uterus, rectum, and descending colon were found. The gelatinous cyst appeared to be connected with the right side of the uterus and the serous with the left side. The ovaries were entirely obliterated, and after a long search not a trace of either could be found. Peritoneum covering the small intestine in the cavity with which the fistula communicated was ulcerated and bathed in pus. The perforation in the intestine was evidently produced by ulceration in the peritoneal cavity passing through the intestinal wall.”

With so much disease it is remarkable that the patient bore the deep punctures so well. It is quite evident from the history that both of the large cysts were punctured, as both serum and a gelatinous fluid exuded. It is also a remarkable case as showing the long tolerance of the peritoneal cavity of inflammation and its products. The abscess which was regarded as parietal was proven to be also peritoneal, and much if not most of the pus that escaped must have come from the peritoneal cavity, as no mention is made in the careful and clear report given of any cavity in the parietes large enough to have kept up so copious and long-continued a discharge. As to the effect of electrolysis it was not an encouraging case.

CASE XXVIII.—No effect from galvanism at first; after two and a half years, the tumor apparently softened into a cyst; diminished somewhat by the percutan application of galvanism. Operators, Kimball and Cutter.

Mrs. E., of Newburyport; February 26th, 1875; widow 38 years old; one child, 13 years of age; husband died seven years ago. Her first notice of any uterine trouble was in 1869, when she suffered from an attack of hemorrhage immediately on her return from a tedious journey to the West, to which journey she attributes this occurrence. Ever since she has been suffering more or less from hemorrhage at each returning menstrual period.

About four years ago, she first noticed an enlargement in the left iliac region. At this time she submitted to an examination by a skillful surgeon, who at first supposed he had discovered a uterine polypus, but finally concluded that the uterus alone was diseased. No particular change has taken place as to the hemorrhage since that time, but the tumor has increased to the size of a nine months' fetal head. She is now anemic and thinks that she is continually and gradually failing.

Examined per vaginam, the os uteri is found hard, somewhat open, with rough irregular edges, not very unlike incipient cancer. This is attended with a thin serous discharge, not offensive nor painful.

First operation.—This day was performed the first operation of the battery. The electrodes were thrust into the tumor on either side two inches. The current was continued for five minutes. No special manifestation resulted. Two hours after the operation the patient declared herself as feeling as well as usual.

March 2d. *Second trial* of the battery. Result same as before.

March 6th. *The third trial* was followed by some pain in the region of the tumor and a slight hemorrhage from the vagina.

1877, August 21st. Measures thirty-six inches around the largest part of the abdomen. Tumor presents a soft and fluctuating feel, exactly as if containing fluid. No vaginal tumor. Os uteri smooth and open enough to receive the forefinger. Uterine sound penetrated seven inches. On tilting the tumor while the sound was buried in the cavity of the womb, the handle swayed backwards and forwards. Aspirated with a hypodermic syringe and obtained a little clear sticky fluid which contained none of Drysdale's or Gluge's cells. Encouraged by the result in Case XLVI. it was decided to try the effect of the strict diet and the galvanism from the small battery described in the said case.

August 26th. Uses battery for three hours daily. Measures thirty-five inches. 31st. Reports having been unwell and differently from usual. Previously she had a copious flow intermingled largely with colorless fluid. Also usually she has dyspnea on exertion for a week after menstruation; now none, and the discharge was scanty and blood alone. Complains of vesication from the zinc electrodes. Noticed a wrinkling of the skin after using the battery. Measurement thirty-four inches. A fluid of a sticky adhesive and slightly reddish color flowed over my hand in conducting the examination. Under the microscope it was found to contain red blood-globules, pavement epithelia, and fibrin coagula. No ovarian cells.

September 2d. Reports several gushes of fluid from the vagina. The specimen shown by her, about two ounces, was slightly turbid and ropy, like the white of egg. Coagulated by heat so as to be solid, like paraffin, and held fast to the spoon in which it was heated, when turned upside down. Sulphuric acid also coagulated it. Microscopical examination showed it to contain epithelia and fibrin coagula. Said the battery made her feel faint.

September 8th. Thirty-six and one-half inches. Putting on flesh. Countenance improved. Bowels bloated. "Appetite enough for three men." Likes her strict diet.

10th. Tumor evidently furrowed anteriorly from fundus to pubis.

14th. Thirty-six inches. Can stoop over or sit in a chair and button up her shoes—a thing she has not done for months. Discharge of glairy fluid nearly ceased. Appetite ravenous.

25th. Been unwell and lost less blood than before. Thirty-four and one-half inches.

28th. Dr. Kimball examined the tumor and pronounced it decidedly diminished in size.

October 3d. At his advice, I introduced a large-sized aspirator needle deep into the tumor through the abdominal parietes in the median line. Obtained about fifteen drops of fluid somewhat bloody, followed by a clot of blood. No further fluid obtained even after considerable force exerted in pumping.

October 5th. States that there was a vaginal discharge after the aspiration which appeared exactly like that procured with the aspirator.

16th. At home engaged in house-work. Use of battery and diet continued.

Remarks.—The idea of the substitution of the small-sized element battery in place of the large one figured on page 2 is in keeping with the original selection of a battery. Fluid or semi-solid collections are supposed to be acted upon by the *intensity current*; solid growths by the *quantity current*. It may be a mere fancy, but the writer is trying to see if it is so in fact.

CASE XXIX.—*Enormous growth; nineteen applications; effects marked by an establishment of good health and decided diminution of tumor. Operator, Kimball.*

Mrs. C., of Dubuque, Iowa, aged about 42 years, came to Lowell in the winter of 1874, being at that time in an invalid state on account of a large fibroid tumor of the uterus. She had been treated for more than the past year by Dr. Atlee, of Philadelphia, taking internally all the while the chloride of ammonium and also applying the same to the outside of the tumor in the form of a solution. The disease was not benefited by this treatment. The tumor continued to increase and the system generally was becoming more or less disturbed. By the advice of Dr. Atlee, she applied to me for the purpose of trying the effect of galvanism. The tumor at this time occupied most of the right iliac and hypochondriac regions. It was very hard and in size not less than eight inches in diameter. It seemed to involve pretty much the whole uterine structure. Examined per vaginam, the diseased mass could not be reached by the finger. The mouth of the uterus, however, was felt just behind the pubic arch. General health of patient quite bad.

First operation.—The battery was applied for the first time on the 4th of December, 1874. The current was continued through the tumor for five minutes. No unpleasant symptoms followed.

December 9th. Second trial of battery. The current was passed through in a different direction for five minutes. Patient and friends insist that since the first application of the battery the tumor has sensibly diminished and become softer.

December 30th. Battery applied for the third time. Effect very profound and decided. Attended with prostration, remarkable slowness of pulse, coldness of feet, pallor of face, etc. Reaction soon followed and all unpleasant symptoms passed off.

December 31st. Patient makes no complaint of the effects of yesterday's treatment and feels as well as ever. Tumor appears smaller. Such is also the opinion of patient and friends.

January 6th, 1875. Fourth operation.—The effect on the pulse and respiration was marked, but less than the last. The current was continued for six minutes. Patient insists that the size of the tumor is sensibly diminishing. She has resumed the use of the chloride of ammonium.

Further operations were conducted about once a week till she had submitted to *nineteen operations*, the largest number ever administered to any one patient. She returned home to the West. Lately her sister wrote that Mrs. C. was attending to her duties as well as ever. Her general health has become perfectly restored and established. The writer added that she thought it my duty to persevere in this line of treatment, judging from the success in this case. When the patient came under galvanism, the tumor was rapidly increasing. By the operations, the growth was arrested at once and very much diminished. This case shows a tolerance of interference which is worthy of note. It also teaches perseverance in striking a succession of blows.

CASE XXX.—*Large interstitial fibroid, very much diminished at the outset; vaginal discharge of detritus; improved health and strength; able to do more work than before; flooding checked; return of disease. Operators, Kimball and Cutter.*

Mrs. C., of Woburn, Mass., a patient of Dr. Wolgamot, married for two and a half years, aged 21 years, no children, had a fibroid tumor of the uterus about five or six inches in diameter, central, interstitial, movable, rising a little beyond the umbilicus and readily felt through parietes just above the pubis. She was troubled with uterine hemorrhage to a weakening and blanching degree, also with a sense of pressure in the lower part of the abdomen, unfitting her for every kind of employment requiring bodily effort.

First operation.—Dec. 18th, 1873, the battery was applied. The electrodes were passed through parietes, one on each side. The current was continued for four minutes under chloroform. The effect of operation was not marked by any pain. In the course of a few days the patient declared that the tumor was much diminished in size. This diminution was attended with some discharge per vaginam. The characters of this evacuation were copiousness, fluidity, and blackness with detritus—not offensive nor bloody. With this she had severe chills, and was confined to bed for two weeks.

Second operation.—Feb. 18th, 1874, the battery was applied a second time. Tumor now very much lessened, "one-half at least," in bulk. Softer and more elastic. The electrodes were entered as before, but instead of meeting the solid resistance offered at the first trial, they met with much less opposing force of the tissues, and suddenly, when passed in about half-way, the resistance ceased entirely, and the electrodes were swept about

and even touched each other. The impression given to the hand was that the instruments penetrated a cavity or hollow space containing gas or fluid of little or no resistance. In other words, the tumor gave every appearance of having been broken down in its central substance into an abscess or cyst, as pus escaped to some extent through the punctures by the sides of the electrodes. The uterine hemorrhage was arrested, but the purulent blackish discharges continued. The general health was improved, although she was much troubled with care and anxiety about her husband, who was in the last stages of consumption. This marital distress weighed very heavily upon her and interfered decidedly with her nutrition.

Third operation.—May 31st, 1874, Dr. Cutter applied the battery much as before. Ether used. The introduction of the electrodes was followed by purulent discharges by the side of them. There was the same feeling of a central cavity in the tumor. This operation was borne so well, and so little apparent direct result followed, that the *fourth operation* was conducted June 6th, 1874. Ether. No purulent discharge this time. The effect was profound. There was pain and tenderness over the tumor and sites of puncture. Cloths wetted in hot alcohol were kept on abdomen. Sulphate of morphia was given by subcutaneous injection. The disturbance of fever and tenderness lasted a few days and then subsided. Owing to the increasing debility of her husband, she felt that all her energies should be given to his care. For this reason the operations were conducted no further. His death occurred soon after this.

In June, 1875, she was examined and found to be in the enjoyment of a good degree of health, though not so strong as she would like. She was on the lookout for a situation as housekeeper. The tumor was certainly less than one-half its original size. She has now no uterine hemorrhage. Her menses are normal. Indeed, the patient regards herself as quite well. Soon after she engaged in employment that required bodily activity, and Dec. 19th, 1876, writes in reply to inquiries: "My health I call excellent. I think my life has been saved. I have very little trouble from that tumor. I worked three months in Wakefield attending store and millinery, losing but one day. I do a day's work nearly every day, and you will please remember I was never considered strong. I am thankful for the saving of suffering."

1877, Jan. 5th. Reports a menorrhagia. Appetite good. When not attending to millinery she is doing housework.

1877, Aug. 21st. Tumor much increased; distinct fluctuation, profuse menorrhagia. Pain severe. Patient very nervous and weak on account of hemorrhages. Gave chlorodyne, gallic acid, and strict animal diet.

September 5th, not doing well.

1878, Jan. Much improved on diet. Tumor lessened.

1879, Dec. 10th. Seen at Salem. Tumor larger than ever. Has been careless in diet and overworked.

CASE XXXI.—*Fears of malignancy not realized; one operation; disappearance of abdominal lobe; diminution of pelvic portion and subsequent slight increase; pain removed and general health good.* Operator, Cutter.

Miss D., of Marlboro, 47 years of age, presented herself Dec. 26th, 1876. Her occupation was that of housework and running a sewing machine. She was a large, imposing person with a yellowish complexion. Always suffered from menorrhagia. Her tumor had existed for four years at least. No increase had been noticed for the last six months. Always regular to within the last two years. Since then hemorrhage had been excessive and exhaustive. Pain is not severe. Backache is constant. During the past summer she had been made sick by nursing invalids. Appetite good. Constipation. Nocturnal numbness and diurnal swelling of the feet. She is extremely nervous. One lobe of the fibroid was found in the right hypogastrium, conical, as large as an orange. The os uteri was enlarged, and a large mass was found developed in the anterior wall of the uterus, hard and immovable.

One operation.—Dec. 29th, 1876, galvanism was applied at 1 p.m. Present, Drs. Kimball, Bixby, and Hanscom. Etherization effected. One electrode was passed into the pelvic portion, and the other about two and one-half inches through the abdominal lobe. Current was passed three minutes. Pulse not affected.

1877, January 1st. She has some heat, fever, tenderness of bowels, bearing-down pains, and desire to pass her urine. Sleeps well. Is able to be up and dressed; also to eat.

Jan. 3d. Uterine hemorrhage not copious. Is very nervous.

Jan. 10th. Has had a menstrual period with less hemorrhage than before, but suffered more pain and passed clots of blood. Feels weak. Is flowing still. Ordered gallic acid.

Jan. 20th. Flowing still continued, looks pale, and feels very weak. Appetite diminished. Dyspepsia. Ordered quinine.

22d. She is weak, discouraged, and suffers so much pain in pelvis that she says "she will die." The abdominal lobe is tender, but in the vagina the tumor seems less fixed, and no local mischief was found to account for the symptoms. Ordered rectal enemas of McMunn's elixir of opium. The tongue was clean, the skin cool, and the appetite moderate. Still she has lost flesh and strength. The flowing continues to a slight degree.

February 7th. Complains of terrible pain every day at 2 p.m. Has headache and bloated bowels. Pulse 84. Skin cool. Tongue moist. Vaginal hemorrhages ceased; now followed with colorless fetid discharges. Feels very weak. Thinks she shall die. Ordered gallic acid by the mouth, and persulphate of iron per vaginam for hemorrhages.

Quinine for neuralgia.

17th. Pain less, but severe. Vaginal discharge continues. Tumor is evidently smaller. Pelvic tumor more elastic. Some hard, freely-moving nodules were felt in the post-uterine

cul-de-sac. Countenance and skin yellow still. Feels as if a "hole was being bored in her back."

Feb. 24th. Pain not much better. Appetite good. Been down-stairs. Less yellow.

March 20th. Feeling and appearing quite well. Has returned to her former diet somewhat. Physical exploration fails to reveal the abdominal tumor. *It cannot be felt.* The pelvic portion is softer and more movable. It is evidently smaller, as there is now a cervix three-quarters of an inch in length where before there was an annular os.

April 21st. No sign of abdominal tumor. Pelvic tumor possibly larger. Feeling quite well and encouraged.

Sept. 11th. Complains of pain through the hip and shoulder-blades. Been keeping house for her brother. The abdominal tumor has not reappeared, the other has slightly increased, as the cervix is shorter than it was. The general size seems lessened, as there is more room in the pelvis.

1880, April 29th. In perfect health. No sign of abdominal lobe. Uterine lobe rather lessened.

Remarks.—Under the circumstances, this proved a satisfactory case. At one time it appeared to be decidedly malignant. A yellow tinge of skin with severe pain sometimes is associated with malignant disease.

CASE XXXII.—Operator, Kimball.

1877, February 4th. Mrs. C., Groveland, Mass., presented a dense mobile pediculated abdominal fibroid "large as a child's head." She was known to be four or five months advanced in pregnancy. Suffered much from pain and distress. Galvanism was applied to her for *four times*. The pain was relieved. She thought the fibroid diminished. The operations did not interfere with the pregnancy, as she has since been delivered of a living child at full term.

Remarks.—This case is noticeable as presenting a new feature, viz., complication with pregnancy and galvanism applied without regard to it. Dr. Kimball says that he acted upon the idea that no one could reasonably expect that the full term of gestation could be safely reached. If the operation induced premature delivery, it could only be doing that which would be inevitable or rather desirable. However, it is remarkable that the gestation proceeded normally notwithstanding the interference.

The writer thinks it a bold measure and interesting in connection with these histories.

CASE XXXIII.—Operator, Kimball.

1877, April 4th. Mrs. W., Lowell, Mass., suffered from an abdominal, pelvic, and interstitial solid fibroid tumor of the uterus, seven inches in diameter. She submitted to *several* applications of the battery in the usual way. No injury resulted.

She thought that the tumor was diminished. This, however, is certain, that, whereas she was a terrible sufferer requiring nearly constant medical attendance for relief, now she is as well as ever she was.

CASE XXXIV.—*Bedridden for eighteen months; general hyperesthesia and vaginismus; defecation causes fainting; effect of one application, painless defecation, ambulation, and anesthesia; in progress; return of bad symptoms, but not to so bad an extent as before. Operator, Cutter.*

1877, April 13th. Mrs. P., Malden, Mass., 35 years of age, married fourteen years; children, no abortions; a year ago was taken with terrible pains and flowing and Dr. C. W. Hackett, her physician, discovered an enlargement in her bowels at that time. She menstruated at the age of thirteen years. She always had vaginismus. In October, 1875, she measured about the waist twenty-one inches and from this date to July, 1876, she had a continuous vaginal discharge. At this time she was etherized by Dr. W. G. Wheeler, of Chelsea, in consultation. The uterus was found to be four inches in depth. Posterior wall evidently enlarged. More distinctly felt through the rectum, it presented two dense and hard nodules. In April, 1877, she measured thirty-two inches. She had lost flesh and strength by being practically bedridden for the past eighteen months. She could neither sit nor walk. She was very nervous and irritable. Could not bear the slightest touch on her back without fainting away. Her bowels were hyperesthetic. She had pains in her limbs, head, and chest. Indeed her nervous system was so deranged that all medicine disagreed and acted curiously. In proof of this, Dr. Hackett said that paregoric purged her. Every act of defecation caused her to faint away with pain. My own palpation of the abdomen and examination of her throat both set her into a violent cough and severe pain. As it was useless to attempt a thorough physical exploration without an anesthetic, arrangements were made to etherize at a future time, with the understanding that if matters were satisfactory the battery would be used.

April 19th. Inspection under ether. No tumor visible.

Palpation. Tumor felt indistinctly through the abdominal walls on account of the presence of a large amount of adipose tissue.

Per vaginam et rectum. A trilobed, dense, and distinct growth was found attached to and incorporated with the posterior uterine wall. Size that of the fist. Uterus four inches in depth. Vagina contracted.

First operation.—Introduced both electrodes per rectum to the depth of two inches and distance apart of three-fourths of an inch. Current passed three minutes. The tumor was very dense and difficult to penetrate.

April 23d. Patient poorly. Severe pain in back. Headache, vomiting, and fainting. Complete disgust of all food. Slight rectal hemorrhage.

May 3d. Anesthesia when before there was hyperesthesia.

Rectal pain all gone. Evacuations painless. Vagina somewhat sore, but allowed of a digital examination which was not possible before without ether or chloroform. Tumor apparently smaller, though the abdomen measures thirty-three inches.

May 12th. She writes, "I take pleasure in telling you that I am able to walk all about the chamber, and can sit on an ordinary chair. Her physician writes, "She eats, sleeps well, for her, and is quite happy. I am joyfully surprised."

May 22d. About her house. Feeling very well indeed. Better than ever before. Vaginismus returning.

30th. Rode out in a carriage.

August 22d. Some pain in right hypogastrium.

Second operation.—September 6th. Abdominal tumor manifest, hard, central, and movable. Tumor behind the uterus seemed smaller. Etherized and passed both electrodes through rectum as before. *The growth was soft and easily penetrated.* Current passed three minutes. Present Drs. Sullivan, of Malden, Bean, of Medford, and Hackett, of Brookline.

17th. Doing well.

24th. Same anesthesia as after first application. Menorrhagia. Though stronger than after the last operation, she is unable to move about. On milk diet.

October 15th. In bed still. Using percutan galvanism. Needs another operation of the deep puncture.

Remarks.—This case is the only one in which *both* electrodes have been passed through the rectum. The result was a great surprise to those concerned. When she appeared in the street she was looked upon with astonishment as one raised from the dead.

Bad symptoms returned, though another operation was practised. In progress.

1879, Nov. 3d. Saw Mrs. P. Grown fat. Up and about the house. Menstruating. Eats animal food mostly. Abdomen enveloped in fat. Could feel no tumor. In good spirits and lively.

1886, April. By report of nurse I hear that her troubles have returned and she lives in distress.

CASE XXXV.—*Large interstitial, subserous multilobar fibroid. Edema reduced. Tumor diminished. Operation well borne. In progress. Operator, Cutter.*

1877, August 23d, Miss S., Malden, Mass., age 24 years. Occupation, shoe worker in a rubber factory. Tumor first noticed in December, 1876. She was a stoutish, symmetrical, and healthy-looking person. In June, 1877, she was seen in consultation by Dr. W. G. Wheeler, of Chelsea, with Dr. French, of Malden, her physician. Since that time the tumor has increased in size. The abdomen presents a movable, multilobar, soft, round tumor, extending from the pubis to beyond the navel. The pelvis was occupied by a large, rounded edematous mass. The os uteri was

dilated, soft, and even-edged. The forefinger readily entered the os and pressure upon the abdominal part crowded the finger up into the uterus. The anterior lip was thin. The tumor appeared to be developed in the posterior lip and wall of the uterus. Per rectum, the tumor felt large and spongy. The chief complaint was of a great deal of pain in the right side for more than a year. No menorrhagia.

First operation.—The patient was etherized.

In the presence of Prof. Vander Veer and Dr. W. H. Bailey, of Albany, N. Y., Drs. Wheeler and Weeks, of Chelsea, French, of Malden, Hackett, of Maplewood, and Bean, of Medford, the writer introduced one electrode to the right of the navel downwards and the other electrode through the rectum. The tumor was easily penetrated. Current was continued for three minutes. She had no after-trouble and soon resumed her labors in the shop. It should be stated that Dr. Wheeler had previously introduced small insulated needles and connected them with the small battery so often alluded to in this report. The result was to cause a subsidence of the swelling and edematous condition of the vagina and pelvis.

September 6th, he made a similar application.

October 15th. It was ascertained that she had lived mostly upon starch and sugary food. She was asked to go upon animal food strictly. The tumor had evidently consolidated somewhat, as shown by the smaller size of the os uteri and the denser feel of the growth.

Second operation.—At 4 P.M., Dr. French etherized her and in the presence of Drs. Dearborne, Surgeon U. S. N., W. S. Brown, of Stoneham, Mass., J. M. Moore, of Woburn, and French, Towle, and Wardsworth, of Malden, the writer introduced one electrode through the abdominal walls and the other through the vagina and posterior uterine wall into the tumor. Continued the current eleven (11) minutes. Pulse 100 throughout. The application was a very thorough one. October 19th. The patient was up and about and experienced no inconvenience.

October 22d. Called and found the patient had gone to Boston. Was feeling quite well. In progress.

1880, February 9th. Tumor enlarged to twice its usual size. Flows all the time for over one year. Tumor projects, is mobile. Small tumors over the surface. Tender. Tried the diet six months without success. Probably not faithful to it.

CASE XXXVI.—*Large abdominal, pelvic, and interstitial fibro-myoid. In two weeks' time after one operation the abdomen diminished five (5) inches in measurement. In progress. Operator, Cutter.*

1877, October 23d. Miss S., colored, single, and house servant. Forty-three years old. Noticed tumor in abdomen for two or three years. Been troubled with flowing for many years. Good appetite and a hearty worker in times past. In July last

she had a very profuse menorrhagia. Been confined to bed since August 8th, not on account of weakness, but of pain. She has used fluid extract of ergot and powdered ergot with no relief and with pain. Ergotin, eight-grain pills, once in four hours, however, arrested the hemorrhage so that she has got along very well at the last two menstrual periods. Complains of pain in rectum of an obstinate character whenever she has any evacuation. Also has had an edematous swelling of the legs at times. Appetite very poor. Cannot eat meat or drink milk. Potatoes and bread her chief living. Tumor hard, many-lobed, abdominal, movable on itself, also pelvic, interstitial, and posterior to the uterus. Measurement thirty-four inches. Os uteri high up in front. Tumor is increasing of late, the ergotin only checking hemorrhage.

One operation.—4.20 P.M., she was etherized by Dr. E. H. Stevens, of North Cambridge, her physician. Present, Drs. Dorr, Hildreth and the writer. One electrode was passed through the abdominal lobe on the left side. The other electrode was passed through the vagina. Current passed four and one-fourth minutes. The pulse kept up well and the operation was evidently well borne.

November 3d. Dr. Stevens reports that she has suffered very much from pain in abdomen. Right leg and thigh have swelled exactly like "a milk-leg." Better now. All insist that the tumor is smaller and the abdomen is changed in contour.

November 5th. Measurement 29 inches. Suffered a great deal of pain since operation. The right leg swelling has subsided and now the left leg is swelled and its venæ comites swelled also. No albumin in the urine. Some rectal pain. Opiates freely administered. Skin cool and pulse natural. Has had considerable fever. Food, unless small in quantity, nauseates her. There was some collapse and sinking after the operation. The shock evidently was severe and profound. Two days after operation menses appeared, and there was a copious flow for three days. After this the discharges were blackish. An improvement in the evacuation of the bowels. There is much less pain and less of a cathartic (castor oil) is needed to produce dejections. Some pain in the bladder and frequent micturition.

The milk-leg complication is new. No doubt the operation was an exciting cause, but the history shows that it had occurred six weeks before the galvanic interference. The five inches diminution of the abdomen was not *all* due to the disappearance of the tumor probably. Still the abdominal lobe was itself apparently decidedly diminished, as shown by palpation.

December 21st, 1877. Dr. Stevens reports a marked improvement. Getting well fast. Considerable detrital rectal discharge.

March, 1878. The pain and hemorrhage abolished. No increase of tumor, but the vital powers are failing. Has had an attack of severe peritonitis. Thinks that the relief from the pain, the con-

sequent disuse of morphia, and stoppage of hemorrhage are sufficient rewards for the operation.

May, 1878. Had gone to Fredericton, N. B., to reside, being in comparatively good health.

SERIES IV. RELIEVED, THREE CASES.

CASE XXXVII.—*Large tumor. Galvanism produced no effect though general symptoms were relieved. Passed over as hopeless and incurable. Operator, Kimball.*

Mrs. F., 33 years of age; never had children; stated that she had noticed for several years a tumor in the lower right side of abdomen—that it has been increasing in size rapidly for the last two months—that she has been regular in her menstrual functions, and that she has suffered intensely for four or five days before relief is afforded by the menstrual discharge. October 12th, 1874, she came to Lowell, and on the 13th submitted to *galvanism* in the usual form. No pain or inconvenience of any kind followed the operation, save a sense of prostration. This passed off very soon, so that on the 18th of the same month another trial of galvanism was submitted to and resulted in considerable soreness of the abdomen in the region of the tumor. Not the slightest constitutional effect otherwise was perceived, subjectively or objectively.

1875, May 22d. *Third operation.*—Tumor in abdomen about the same as when she was operated on in last October. The battery was applied to the growth, one electrode passing through the abdominal walls and the other electrode per vaginam into the portion of the tumor which was occupying the pelvis to a considerable extent. No marked effect followed this operation. In twenty-four hours after this application she felt as well as ever.

Fourth operation.—May 29th, 1875, another operation was performed. Electrodes were passed, one through abdominal walls, and the other through the vagina. This was followed by considerable pain and soreness. No impression was made upon the tumor, but the general symptoms were relieved and the case was passed as one which electrolysis could not benefit, only relieve.

CASE XXXVIII.—*Large tumor. Fibro-myoid. Galvanism procured a little relief. Operator, Kimball.*

Mrs. P., of Worcester, aged about 40 years. Though long married, never had any children. For some time she has been aware of an increasing growth in the abdomen. It is hard, movable, occupying the pelvic cavity, and extending up nearly or quite to the umbilicus. Frequent attacks of hemorrhage from the uterus constitute the chief inconvenience felt from it. These attacks have become of late so severe, and the loss of blood so great, that she is now much prostrated, and has been unable to attend to the duties of the household. Her history shows that she has taken some medicine—tonics of iron and so forth. She has tried the effect of *faradism*, but only as applied outside (percutan method) by application of sponges to various parts over the tumor.

First operation.—She came to Lowell June, 1874, and galvanism was applied to the tumor by passing the electrodes deep into the diseased mass, on opposite sides of the abdomen; current was continued ten minutes under chloroform. No special effects followed—that is, no pain or other unpleasant symptoms. Two days afterwards, a periodical attack of hemorrhage occurred and continued three days, but it was not so severe as had been experienced usually. There were *other applications*. The result was in a little relief to the symptoms.

CASE XXXIX.—*Complications: ascites, cauliflower ulceration of the os uteri, severe vaginal hemorrhage and great debility. Dropsy relieved; hemorrhage checked and general health and morale improved. Fistulae formed; healed. Calcareous degeneration. Death. Operator, Cutter.*

1876, November. Mrs. H., 34 H— street, Cambridge, Mass.; was mother of one child; is a colored woman, 55 years of age. Her fibroid has existed at least fifteen years. It is dense and multilobar. It is also increasing in size. She has been troubled with severe vaginal discharges of blood and watery flux. Her husband says she "has bled like an ox." She is now running down very fast; has been confined to bed for the last three weeks entirely. A vaginal examination revealed an extensive cauliflower excrescence and ulceration of the entire neck of the uterus. The impression made was one of malignancy; but her physician, Dr. H. O. Marcy, says he thinks it decidedly not so. At any rate the case is a hopeless one with ordinary treatment; pain is not great. Complaint is of terrible weakness and prostration. She shows a paleness, if such a word is possible to be used with one of her color.

First operation.—November 25th, as a dernier ressort, at 10 A.M., in the presence of Drs. Marcy, Holt, Clarke, and Edgerly, the patient was etherized and the writer passed in one electrode through the tumor a little below the navel on the left side. The other electrode was passed in above and to the right of the navel about two inches in depth. The current was passed only three minutes on account of the great weakness of the patient, whose pulse became very quick with symptoms of fainting. Some fluid escaped through the punctures during and after the operation. There were some convulsive twitchings of the abdominal muscles when the connections were made with the electrodes. Next day Dr. Marcy packed the vagina with a styptic. Oozing had ceased.

November 27th. Found the patient getting out of bed; bowels much less distended because of the disappearance of the ascites; hemorrhage from the vagina had ceased.

December 7th. Not so well; suffered from heat and fever; bowels were sore and tender; in bed; considerable colorless liquid flowed from the vagina; operation deferred. Is this case malignant? December 13th, I found Mrs. H— half dressed in bed. She states that she is up more than half of the time; the watery vaginal discharge has lessened; the abdomen is wrinkling up, but

still tender; no appetite; evidently her morale is improved. On being asked if the operation had done her any good, she looked up astonished, and after a considerable pause said, "lots of good." Ordered elixir of calisaya bark as a tonic and appetizer.

December 27th. In bed; temperature of body cool; appetite is good; bowels less tender; no metrorrhagia since operation. She wants another application. I thought it advisable, though the attending physician dissented; afterwards he withdrew his dissent.

January 3d, 1877, *operation* repeated; electrodes were introduced under ether three inches deep; current was passed three minutes; the pulse at the beginning was 96, at the close 84; hands were cold, face a little pinched; serous fluid exuded from the punctures.

January 9th, I found Mrs. H. in bed, pulse regular, countenance good. She said she should be up and about the house if it was not such very cold weather; bowels compact and a little tender; appetite good.

January 18th. In bed still, but feeling pretty well; tongue coated; she is in want of good care and nursing; the puncture on the right side is open and oozing. This is probable due to the uninsulated part of the electrode coming in contact with skin.

February 16th. Fistulæ at site of both punctures, some oozing and scabs about them; no pain or discomfort; patient up and dressed and about the house; great appetite; no hemorrhage from vagina.

March 14th. Fistulæ closed under the use of plaster and nut-tion tallow; up and dressed; feeling well, but feeble and weak; countenance improved; no ascites. About ten days ago she had a return of vaginal hemorrhage, which was relieved by an injection of warm water.

27th. Two more hemorrhages; feels discouraged and indisposed to continue applications.

April 1st. Dr. Marcy and myself examined the vagina by touch and Sims' speculum. The diameter of the vagina and cervix uteri appeared less than at the first examination. The excavation was longer and deeper, instead of being flattened as before. The cervix was granular, irregular, and torn as if dog-bitten. Slight hemorrhage; appetite very good for her.

May 3d. She uses the St. Leon's spring water with success for constipation.

Third operation.—Present, Drs. F. M. Dearborne, Surg. U. S. N., Sanford Lawton, of Springfield, and Marcy with the writer etherized the patient. The lower lobe on the right was penetrated to the depth of three inches; the other electrode was directed into the uppermost lobe in the abdomen; it met with a solid resistance. More force was applied and the instrument suddenly slipped over the surface of the lobe, made its exit through the skin and punctured the middle finger of the writer. The handle of the electrode was broken; tried it again and intro-

duced the point only. Evidently there was a stony hardness due to calcareous degenerations. Another lobe lower down was more readily penetrated. Four-minute application. It was feared this repeated and prolonged penetrative efforts would produce serious harm.

May 8th. Found her dressed, sitting up in bed and sewing. She suffered a good deal after the operation for a time. Punctures healed; bowels somewhat tender; pulse normal; skin cool; cuts. Husband states "that she suffered terribly after the operation and he thought she would die." He desires no more operations. Death from the recurrence of the bad symptoms occurred in the course of six months.

SERIES V. CURED, ELEVEN CASES.

CASE XL.—Enormous tumor resembling full term of pregnancy; marked decrease in size following application of galvanism; teaching resumed; permanent relief of pain; cure. Operator, Kimball.

Miss C., Salem, Mass., school teacher, maiden lady, 43 years of age, had fibroid disease of the uterus of several years' standing, previous to March 2d, 1874. Till within a few months it gave no special inconvenience. Lately, it has made a serious impression upon the constitution, especially from its having been attended with frequent and profuse hemorrhages. She was obliged to relinquish school teaching, and had given up hope of ever resuming it again. She has made use of no special treatment, but has resolved finally to try the experiment of galvanism. For this purpose she came to Lowell on the above date.

First operation.—On the next day, the 3d of March, 1874, galvanism was applied for the first time. The electrodes were introduced into the tumor three inches through the parietes on either side of the umbilicus, four inches apart. The current was continued *ten* minutes under chloroform. No pain followed the operation. Next day there was considerable soreness in the region of the tumor, and some uterine hemorrhage. She was kept quiet in bed for two days. Meantime the hemorrhage nearly ceased. For a week after this the patient kept about her room free from suffering of any sort. Her appetite was somewhat disturbed at first, and finally returned as good as ever. No obvious diminution of size of tumor.

Second operation.—March 11th, galvanism was applied for the second time, and in the same manner.

Other operations.—It was subsequently applied several times, and the improvement was so marked that she left for home in April and resumed her occupation as a teacher. After her return to Salem the pain recurred. Her general health was greatly improved. She had lost something in weight, and as to size, there was an evident diminution of the tumor. On account of the pain she visited Lowell again on May 1st, 1874. Meanwhile she had been steadily engaged in school teaching. On the

whole she was gratified with the results of the treatment. *One application* of the galvanism sufficed to remove *permanently* all the pain of which she complained. Subsequently there was a very marked additional diminution of the tumor, so much so that whereas before her appearance on the street she resembled a woman just about to be confined with a child, now there was no enlargement visible to an uninterested observer.

1886, Dec. 7th. Report: "My health now seems to be perfectly restored. I am very grateful to Dr. Kimball and all connected with him for the skilful treatment which brought me from confirmed invalidism to my present state of health."

CASE XLI.—*Large fibro-myoid increasing in size; general health bad; menorrhagia; tumor diminished and softened; general health much improved; subsequent increase of tumor; April 30th, 1878. Cure, 1884. Operator, Cutter.*

Miss K., of East Boston, was 44 years of age when first seen in 1875. She was a single woman, of Scotch descent, deaf, and her occupation was that of keeping a fancy dry-goods store. She presented a large fibroid tumor mostly abdominal. It was first noticed ten or twelve years ago. It was very hard, multilobar, and the lobes were glued together. Lately it has increased in size. She was troubled with pressure in bowels and gnawing sensations, menorrhagia, and dysmenorrhea. General health was never very good, and is subject to rheumatism. She had lived almost entirely upon a farinaceous diet.

First operation.—June 10th, 1875, in the presence of Drs. W. S. Brown, of Stoneham, and A. Ricketson, then of Woburn, I applied the battery, using four ounces of ether. The electrodes were passed into the growth three and a half inches deep on opposite sides of the abdomen. The current was continued for five minutes. Pulse was 72 and feeble. It continued throughout the operation, except that it was increased in fullness. On coming out of the ether, she expressed herself as suffering from pain, and one-quarter grain of the sulphate of morphia was administered subcutaneously with relief. No ill came from this operation. She was put upon animal diet exclusively. At this time the measurement was thirty and one-quarter inches over the most prominent part of the tumor.

Second operation.—June 30th. There was no difference in the measurement. Tumor more mobile. Appetite and general appearance improved. She states that she suffered more from the ether than the punctures. Hence, in this application, the endeavor was made to give as little ether as possible. A coarse linen towel was used, four thicknesses, folded square. A spot in the centre was saturated with ether. The towel was then held closely over the mouth, and the patient, previously instructed, drew in long inspirations. The air easily passed through the meshes of the towels in and out. The carbonic acid gas was exhaled, and the inspired and expired air was thoroughly loaded

with the vapor of ether. The anesthesia was quickly obtained, and only three ounces were used during the operation. The electrodes were introduced as in the first instance. The current was continued for five minutes. The carbon electrode pulled out hard, and the zinc electrode easily. The patient also came out of the influence of the ether readily, and was not so sick as before. Following this application there was some soreness, but not much general disturbance.

Third operation.—July 15th. She experienced no inconvenience from this “last” operation. Effects were not marked, except that there was no menorrhagia at the last period. Appetite about the same. There was some complaint still of the ether, and this time especial care was taken not to use more than was absolutely necessary, so that only one and a half ounces of ether were consumed. Yet anesthesia was maintained during the five minutes’ passing of the current. Pulse was natural throughout. Operation well borne. No trouble from ether. The electrodes were passed into the large lobe on the right.

July 22d. She was somewhat prostrated by this application. She had some tenderness, and required nursing and lying in bed longer than after previous ones.

Fourth operation.—September 16th. This application was honored by the presence of the venerable Dr. Phineas M. Crane, of East Boston. Measurement was noted to be twenty-nine inches instead of thirty and one-quarter, as before. The current was passed through the right lobe, as before indicated, for the space of eight minutes. Pulse rose from 60 to 80 during the application. Appetite about the same. Animal food was enforced, but with difficulty, as the patient turned against it.

Fifth operation.—Measurement twenty-nine inches. General appearance has improved, though the appetite is not very good. She had a severe pain, lasting for two hours, all over the bowels and a tenderness that lasted over a week. Still she said she got over the last operation better than any other. She was etherized and the electrodes again thrust into the right lobe as before. The current was continued ten minutes. Pulse good throughout.

Sixth operation.—Oct. 29th. Measurement twenty-nine and one-quarter inches. Not much effect apparent from the last operation. It was repeated in the same manner in all respects. One electrode was passed in on the right side and the other on the left. Palpation and the diminished resistance given to the electrode showed the tumor to be decidedly softer on the right. The current was continued for *fifteen minutes*, a longer time than ever employed in *any* case. Pulse 72 throughout.

Nov. 21st. It was reported that from one to two pints of serous fluid exuded from the wound, curiously enough, on the *left* side. No ill resulted therefrom.

1876, Jan. 6th. *Seventh operation.*—Drs. D. F. Lincoln and E. Cheney were present. One of these gentlemen was a spe-

cialist in electricity, and made a careful examination of the procedures. The general condition of patient had improved. Evidently a profound impression had been produced by the repeated blows of the successive operations, as the tumor felt much softer on both sides. At this time a new method of locating the electrodes was practised. Instead of being kept as far apart as possible, they were passed in from either side, so that one overlaid the other—the distance being not less than one-half an inch between. The resistance felt like that of cheese. The current was passed through fifteen minutes. No thermic effect was produced, and of this the electrician was satisfied. The blood that flowed out on the groove of the carbon electrode coagulated into a firm clot. The blood on the zinc electrode was fluid. The clot proves that the current *did* pass between the electrodes. A few days subsequently Dr. Cheney visited the patient, and reported that there was a deep transverse fissure in the tracks of the electrodes, another proof of some local action.

October 29th, 1876. Drs. T. G. Thomas, Semeleder, Wheeler, and Warner, with the writer, visited Miss K. They found her apparently quite well. The tumor had lessened from its original bulk and had changed its character from multilobar to multinodular. The patient attributed the great benefit to the change of her *diet from flour to animal food*.

And here it may be remarked that the animal food diet was adopted on the suggestion made by Dr. James H. Salisbury, that these fibroid growths owe their existence mainly to an excess of starches and sugars in the food. Other cases sustain this position.

In a letter dated 1886, Dec. 2d, she writes, "the tumor went away two or three years ago."

CASE XLII.—*Diminished one-half. Two applications. Subsequent entire disappearance. Operator, Kimball.*

Mrs. P., Manchester, N. H., 26 years of age. Tumor as large as a bowl. Unwell twice a month. The tumor was hardish and punky. Gave her two applications of electricity with an interval of three days. Current was continued five minutes in each case. It made a tremendous impression, causing severe pain, vomiting, and prostration. The first application was through the abdominal walls, the second through the vagina. Before the first operation the neck of the uterus could not be felt or found, but the finger came in contact with the fibroid. Result of the operations was a diminution of the tumor one-half, and she could cross her lower limbs which she could not do before.

October, 1877. Dr. Kimball reports that he saw her incidentally and that the tumor had *entirely disappeared*.

CASE XLIII.—*Large fibro myoma. Three applications. Complete and permanent cure. Published January 29th, 1874, Bost. Med. and Surg. Jour., p. 112. Operators, Kimball and Cutter.*

"About the middle of April, 1873, I was called to see Miss F.,

of Haverhill, a maiden lady, 34 years of age. I found her suffering from a large uterine fibroid of two or three years' growth. It was hard, globular, movable. She was very feeble and anæmic from frequent and profuse hemorrhages; she had given up to die and was stated 'to have gotten through with all the pangs of death.' The recent increase in the size of the tumor, together with various symptoms of local and constitutional suffering, suggested the necessity of some speedy and effectual relief. Seeing no occasion for surgical treatment, I proposed the trial of electrolysis. The proposition was accepted at once.

First operation.—A few days after, the 22d of April, galvanism was applied, Drs. Cutter and Chase assisting. Chloroform was given and the electrodes were passed through the parietes of the abdomen on either side, penetrating the hard tumor about three inches with ease. The current was then continued *three* minutes, with an effect seemingly less profound than in the previous cases where *no* anesthetic was used. There was no expression of suffering of any kind on coming out from the effect of the chloroform. For the week following, this case presented no new or specially marked symptoms. Evidently no harm was done and the patient was left in bed. On account of my absence and Dr. Cutter being in a distant part of the country, this patient was not approached until the latter part of June. During this time, however, she seems to have made favorable progress; her health generally was improved and the tumor had manifestly diminished somewhat in size.

Second operation.—Assisted by Drs. Coggsell, of Bradford, and J. R. Nichols, of Haverhill, Dr. Cutter made the second application of galvanism the 23d of June. Electrodes were introduced as on the previous occasion, and the current was continued *five* minutes. The pulse was somewhat quickened, the hands and legs rather cool; but slight prostration followed. Next day the patient was very comfortable. In bed and made no complaint of suffering of any kind.

Third operation.—August 22d, galvanism was again repeated by Dr. Cutter, assisted by Drs. Chase and Nichols. The progress was in all respects the same as before. General improvement had gone steadily on up to this time. The tumor had gradually diminished. Such was the state of things on my arrival home from Europe the first of September. About the first of October the patient called on me in Lowell, in order that I might the better judge of her actual condition by a professional inquiry and examination. The result of the interview was most gratifying. It appeared that from the day of the first experiment with the battery up to the present time *there had* been a regular improvement in every particular, but more especially in regard to the local malady. The tumor, which only six months before I had seen occupying a large portion of the pelvic cavity and extending quite up to the umbilicus and not less than eight or nine inches in diameter, had now so far disappeared that what remained yet could

scarcely be felt. Its final disappearance altogether can now hardly be questioned, and with this event it is reasonable to suppose recovery will ultimately be complete in all respects. (This anticipation has been perfectly realized; October, 1877). In this instance, electrolysis has certainly achieved a complete triumph. The means used and the results that followed are too closely related to admit of the question of mere coincidence.

Whatever may come of a further trial of galvanism, whether as applied to uterine fibroids or to any other form of disease, enough has been accomplished in this single instance to show that as a therapeutic agent it deserves and must eventually receive from the profession a far greater consideration and confidence than has yet been bestowed upon it.

The patient at the present is in perfect health. Lately examined by the vagina and abdomen, not a trace of the tumor could be discovered. It should be stated that after the first operation there was more or less of a flow from the vagina of a dark-colored fluid which ceased with the entire disappearance of the tumor. It would be very gratifying to record a like result in all cases; but truth and candor compel a different relation.

CASE XLIV.—Large tumor reduced one-half. Menorrhagia and intermenstrual flowing checked. Health restored. 1879, October 18th, on examination, tumor entirely gone. Operator, Kimball.

Mrs. A., of Boston, a widow aged 43 years, was seen first on November 5th, 1873. She has had three children; for many years has had uterine disease. On examination, it proves to be fibroid enlargement—interstitial, irregular, and pressing backwards against the rectum. She is very pale and languid from the loss of blood, having suffered from excessive hemorrhage for years, and persistent uncontrollable flowing between her regular periods, so that she is in a decidedly anemic condition and is unable to endure bodily exercise without a sense of extreme exhaustion.

First operation.—Galvanism was suggested, and with the advice of her physician the battery was brought to bear upon her case on the same date, viz., November 5th, 1873. The electrodes in this case were introduced deep into the fibroid growth—one through the rectum and the other through the vagina. The current was applied five minutes. The effect of the chloroform having passed away, a good deal of pain was felt in the region of the tumor. In about two hours, a severe chill was experienced, lasting nearly two hours. It was followed by high fever, thirst, and a pulse of 120. Six hours after the operation, the pain and fever had subsided and the patient passed a comfortable night. The urinary secretion was very abundant.

Other operations.—There were other operations resorted to with effect, as the tumor was reduced more than one-half in size. The hemorrhage at the menstrual periods and between had a cessation to a normal point. General health restored.

1879, October 18th, on examination *tumor entirely gone.*

CASE XLV.—*Three operations. Tumor pelvic; myo-fibroid, reduced one-half by first application of the current, three minutes' duration. Subsequent entire disappearance. Operator, Kimball.*

Mrs. C., of Haverhill, Mass., aged 23 years, October 12th, 1874, consulted Dr. Kimball with her attending physician Dr. William Coggeswell. Found her suffering from a fibroid tumor of the uterus of several years' standing. She had experienced great inconvenience from its pressure upon the bladder, causing a constant incontinence of urine and also requiring each time the bladder was evacuated a forcible pressure over the pubic region. Occasional hemorrhage and a persistent serous discharge followed menstruation; her nights were disturbed; there was a sense of pressure in the pelvic region. Examination disclosed the presence of a fibroid growth involving the entire body of the uterus, and so developed as to almost entirely fill up the vaginal space. The finger carried upward directly under the arch of the pubis passed over a rounded tumor, quite smooth and about five inches in diameter. The neck of the uterus could not be felt in this direction. The finger passed posteriorly was at once arrested in a cul-de-sac within less than one inch of the vulva and without touching the os uteri.

First operation.—Applied the galvanic current October 19th, Drs. Howe and Towle present. Both electrodes were passed into the tumor through the vagina; the points of entrance were about two inches apart; patient under chloroform; galvanism continued for three minutes. On recovery from anesthesia, there was very little suffering. The next day the patient seemed very bright and cheerful and so continued till November 3d, the date of my second visit. Her condition had been very satisfactory, no suffering from the effects of the operation. On the contrary, her health had generally much improved; pressure upon the bladder gone; incontinence of urine much less. Instead of being obliged to leave her bed many times during every night, she was now able to rest most of the night without that necessity. *Examination of the tumor showed a diminution of one-half, and instead of the peculiar hardness of a firm fibroid, the diseased organ had become quite soft and flabby.* The patient expressed herself as greatly improved. The same day the galvanism was applied for the second time, through the vagina, as before. Dr. Cogswell assisted. The third operation was performed six weeks after the second. The general improvement still continued; the patient was able to walk about among the neighbors without difficulty; the pressure on the bladder was greatly relieved, and incontinence of urine was much better.

Subsequently the tumor entirely disappeared, but this was not followed by a restoration to health. It was reported that the patient did not receive proper care and nursing, but became bed-

ridden with a large bed-sore, and died finally from exhaustion--a sad result in so striking a case. The nature of the complication was not known, as there was no autopsy. The striking points in this case are: the rapid diminution and subsequent disappearance of the fibroid, and the failure of this marked removal of disease to restore health. As far as the galvanism goes, it has a very gratifying result which otherwise could hardly have been deemed probable or possible.

CASE XLVI.—Petric and abdominal fibro-myoid diminished by one operation of fifteen minutes, afterwards the large abdominal lobe became cystic. Aspiration of purulent chocolate-colored liquid. Application of percutan galvanism to cyst. Diminution. Operator, Cutter.

Miss U., of —, unmarried, aged 44 years, came under my charge October 30th, 1875. Her health was never very good. She had noticed the growth in her abdomen for a year or more; said it came on very suddenly after a severe strain received on lifting a heavy bedstead; she suffered from pain and pressure in bowels, constipation, dyspepsia, and frequent micturition. There was no excessive uterine hemorrhage; the thighs ached. She was very weak, reclined for most of the time on a lounge, but yet performed the duties of a housekeeper. The fibroid was one of the stony-hard variety, multilobar. It nearly filled the pelvic cavity with an immovable mass that crowded the uterus forward and twisted it under the arch of the pubis so that it could be felt only with difficulty. The abdominal portion of the fibroid was movable and sore to the touch. It lay so closely to the iliac bone that there was hardly any fissure to be detected between. The feeble condition of this patient was thought to preclude her from the application of galvanism at present. She was advised to live upon the strict animal food diet until her system should be recuperated, so there should be more vital force to respond to the stimulus when applied. Whether this idea was correct or not, it was adopted and carried out to the letter of the law. A more faithful and obedient patient is rarely found. Moreover, she took quinine and a laxative that had agreed well with her, also baths of aromatic sulphuric acid, one drachm to the pint of water, night and morning. With varying experiences she spent nearly nine months under this régime. The pain and soreness improved. The tumor evidently lessened in size, as shown by the looseness of the dresses and the larger size of the fissure between the ilium and the tumor; health and strength were better. In July, 1876, she went to the sea-shore in order to derive benefit from the climate. The change agreed well with her. She gained flesh, appetite was good, and she appeared in sprightly spirits. At this time it was thought that this would be a good opportunity to derive benefit, if any, from the application of galvanism. It was not that she was not progressing satisfactorily under the diet treatment, but that she wished to derive all the advantages

possible from any additional resource adapted to the peculiarities of her case.

One operation.—Accordingly, on July 31st she was etherized and submitted to the battery at 3 P.M. Present, Drs. F. A. Sawyer, Wareham, and L. H. Luce, Tisbury, Mass. The apparatus was in fine order and struck out very large sparks, evincing the presence of a powerful current. One electrode was passed through the rectum and the other flatwise through the large flattened lobe of the fibroid which measured $6\frac{3}{4}$ inches by 6 inches. Current was continued fifteen minutes; pulse not much accelerated; some vomiting. The patient was bathed in a warm sweat; equal parts of alcohol and water were applied warm to the bowels; coffee and diluted alcohol were administered by the mouth. Considerable fever and thirst, followed with great prostration, continued to annoy the patient for so much longer time than usual that I regretted continuing the current for fifteen minutes; a shorter time would have been sufficient without the serious effects. In the course of a week or ten days she was afflicted with an obstinate cough that kept her bowels stirred all the time. It was associated with a sore throat and enlarged tonsils, reminding one of diphtheria. Local applications of the liq. ferri persulphatis, U. S. P., relieved the cough. Eighteen days after the operation she returned home feeling comparatively well. Soon after she took cold. An unusual degree of soreness in the right lobe of the fibroid followed.

September 22d. The report reads: "Miss —— has considerable prostration, abdominal swelling and tenderness, and considerable pain to the right of and above the navel near the hepatic region. Still she says that in the following particulars the galvanism relieved her:

1st. Constipation, which had existed for many years, has been removed since the operation.

2d. She can lie all night without being obliged to rise and empty the bladder as before the galvanism.

3d. The distress 'low down' has been relieved.

4th. Her sleep is now continuous and unbroken, for which she feels especially grateful.

5th. She feels that the effect of the galvanism was very profound and 'took a great hold upon her,' but that it generally has been of great benefit to her."

A singular and unique feature of the case is the peeling off of the epidermis from both hands. This was thought to indicate the influence upon the systemic nutrition.

November 1st. Complains of a very troublesome cough which a careful exploration of the lungs and throat do not explain. Used the nascent chloride of ammonium with some relief. The bowels were tender and there were no physical signs of the great changes which followed.

November 27th. Complains that the tumor is increasing, as she finds she is growing larger. She has chills daily, followed by

afternoon fever. Cough very troublesome. General malaise. Tongue coated. On examination, I found a remarkable, unexpected, and unique result. The right side of the abdomen was distended by a large rotund tumor, which, percussed or palpated, gave a distinct wave from side to side and could be felt in the vagina communicating with the uppermost part of the swelling. Two or three round and hard fibroids were felt in the pelvis, and it was estimated from the increased room in the vagina and rectum that they had diminished at least one-half since the application of galvanism. There was a change from the dense unyielding mass to a soft elastic fluctuating cyst.

December 1st, 4 P.M. Aspiration withdrew one pint of a creamy, purulent, chocolate-colored fluid. So much intense suffering was produced that I was obliged to stay the aspiration before all the fluid was drawn off. That so much severe distress should have been produced by the smallest aspirator needle seems unaccountable and peculiar. There was syncope and fainting. Under the microscope the fluid was found to contain pus-cells, granules, granular wine-colored masses like those found in ovarian fluid, fat, and débris.

December 2d. Aspiration having proved to be so severe, and galvanism after the previous method being deemed inadvisable, it was decided to act upon the purulent fibro-cyst by means of the constant current furnished by a ten-celled small copper-and zinc battery, newly invented by the writer, passed by the "percutan" method, that is, through the skin without penetration. This battery was devised to meet the want of a simple, cheap, and effective source of galvanism sufficient to decompose water and capable of acting upon all abnormal liquid collections within the body with the view of dissipation. It is contained in a paraffin paper box, $4\frac{3}{4} \times 3\frac{1}{2} \times 2\frac{1}{4}$ inches. Ten cells are bored in a paraffined block of wood. A coil of copper-wire fits into each cell. Next a lamina of black walnut veneer is curled up inside the coil of copper. Inside the walnut is the zinc element. Each copper is connected with the next zinc. The battery is excited with strong vinegar. It should be washed and cleaned with water after use.

Miss C. was instructed to use this battery at least three hours daily. One electrode was to be placed on one side, and the other electrode on the other side of the cyst and to be changed about as the skin should become sensitive. Quinine, baths and animal food continued.

December 5th. The cyst is evidently smaller. Battery has been applied thoroughly and works well. Suffering from pain in abdomen. No marked chills. Considerable thirst. Hotter in the afternoon. Pulse 108. Takes six grains of quinine daily. Don't sleep much. Lower limbs have spells of nervous distress. Measures over the crests of the ilia twenty-nine inches. *Veratrum viride* given.

December 8th. Dr. Kimball saw her for the first time. Regards her case as a curious episode in the history of galvanism

applied to uterine fibroids. Thought the cyst might be ovarian. His prognosis was decidedly bad from the dangers of septicemia. It must be remembered that he was familiar with such symptoms occurring after capital operations. As compared with her last condition she was better. Pain much less. Pulse and tongue normal. Cyst still diminishing and softer. The small battery was applied often and long. December 12th. Found her up and dressed. Lively spirits, pulse, tongue and skin natural. Appetite and sleep good. Able to move about much better than before. Tumor tympanitic over upper half and down at left lower side. Battery works well.

December 19th. Much better. Appetite good. Sleeps well. No chills. No fever. Tongue clean. Pulse natural. Can lie on her left side, which before she could not do. Cyst appears smaller, less fluidity, and harder. Complains of more bearing-down pain in lower abdomen, of frequent micturition, and of constipation.

1877, January 25th. Battery causes pain and is discontinued. Tumor denser and less elastic.

February 3d. Cyst has enlarged and fluctuates and has lost all the denseness seen at last visit.

February 4th. She passed per rectum a cupful of matter which smelt like rotten eggs, and was of the color of the aspirated fluid. Tumor lessened in size.

February 15th. Night's rest broken by frequent micturitions. Tumor continues smaller. Cough very troublesome. Let up on her diet and allowed more license.

February 27th. Cough relieved by inhaling steam of hot water in a coffee-pot. Abdominal tumor lessened more and hardened. Pelvic portion also diminished. Takes Trommer's extract of malt.

March 14th. Feeling very much better. Appetite good and food digested. This is attributed to the use of the malt. Vaginal douches of hot water quiet the vesical tenesmus. Uses the battery again three hours daily. Tumor in abdomen, entirely to the right of median line, somewhat tender. Takes rice, oatmeal, crackers, and pilot bread.

March 27th. Vaginal douche fails to relieve as before. Otherwise improved.

April 14th. Gradually growing stronger. Menses last week scanty.

April 28th. Vaginal douche relieves again. Uses one electrode of the battery in the vagina. Abdominal tumor still lessened in size. More room in pelvis.

May 8th. St. Leon water now a success. Goes out in sunshiny weather.

August 31st. Returned from vacation with improvement in flesh and strength.

September 22d. Abdominal tumor quite small. Pelvic portion apparently increased in size.

October 20th. Goes to church and rides out. General appearance good. It is but just to add that the patient regards her improvement due to the *diet* more than to the galvanism, although continuously applied for almost a year.

1880, January 28th. Fibroid diminished very much. Measures around the waist twenty-four inches. Over the crests of the ilia, thirty-four inches. A little obese. The tumor is evidently diminished. Menses regular. General appearance improved.

1886, November 24th. In apparently perfect health. Two nodules, each of the size of a chestnut, felt in the cavity of pelvis over the sacrum. The cervix uteri which for many years was jammed against the pubis is more than one inch distance off. With difficulty by bimanual manipulation a tumor is felt between the vagina and left hypogastrium.

CASE XLVII.—*Entire disappearance and recovery. Probably fibro-cystic. Re-appearance and disappearance. Operator, Kimball.*

Mrs. H., Manchester, N. H., July 14th, 1875, complained of bearing-down and other uncomfortable feelings in the lower part of the abdomen. Never had any children. Age about 40 years. An examination showed a small enlargement in pelvic cavity, but from the thick covering of adipose tissue it was difficult to say whether it was uterine or ovarian. Finally, supposing it was the former, it was concluded to try the effect of galvanism.

First operation.—Operation performed on the above date. From the readiness with which the electrodes penetrated the tumor, there was some good reason to suspect the presence of an ovarian cyst.

Second operation.—On the following day, no marked effect was observed from the galvanism and it was re-applied.

After several other applications, the tumor entirely disappeared and she returned home. Subsequently it re-appeared and she returned to Lowell for the purpose of another trial.

Twice she submitted to the operation. On proceeding to operate on her for the *third* time, no evidence whatever was found of the existence of a tumor.

Remarks.—It would be politic perhaps not to mention this case at all, because it may seem to prove too much. But as this is a historical rather than a paper of special pleading, it is given with the doubts here expressed. It was gratifying to have the tumor disappear and the patient cured, which result is very much more than was ever anticipated.

Arrest of development only was all that was hoped for. This aim must not be lost sight of in the perusal of this paper. We are disposed to call this case fibro-cystic. As showing the true experience derived from these newly-tried procedures, it has a marked place in the history.

Postscript, January 30th, 1877. The tumor has not re-appeared. General health still good.

1880, May 27th, Dr. Kimball reports that Dr. How, the attending physician, says the tumor has re-appeared, but to a small extent. There is no interference with the general health.

CASE XLVIII.—*Large fibro-myoma. Multilobar. Abdominal. Pelvis packed. Dysmenorrhea. Metrorrhagia. Severe nocturnal colics. Inability to lie on left side. Pale, thin, and anemic. Operator, Cutter.*

Miss L. T., of Stoneham, Mass., dressmaker, age about 40 years, had large multilobar fibro-myoid, existing for fifteen years. Tumor occupied the abdomen from pubis to beyond the umbilicus and packed the pelvis.

She complained of excessive pain in left lower abdomen, particularly at night after going to bed. This occurred *every night* without fail and often was so severe and serious as to involve the presence and assistance of her family physician; of frequent micturition, especially at night, thus breaking up her sleep; of constipation of the bowels; of pelvic pressure; of excessive and exhaustive uterine hemorrhages; of a loss of appetite; and of a loss of her hold upon life so much so that she had about given up to die of despair.

Her physician, Dr. William F. Stevens, of Stoneham, called my attention to her case in July, 1874. I found the pelvis packed with a fibroid as hard as a rock. The digit could penetrate the vagina only a little distance and in the rectum it encountered the growth very readily.

In the abdomen there were found several lobes of varying sizes and shapes, ovals and flattened obovoids, all movable to a limited extent. In the left iliac region, where she had the severe nocturnal colics, was the largest lobed oval measuring 3x4 inches. The patient's general appearance was bad and of an ordinary pregnancy at term. She was pale, spare, thin, and anemic. She was advised to make trial of electrolysis and fully informed as to the experimental character of the operation. The risks were stated and fully understood.

First operation.—She made her will and July 28th, 1874, the battery was applied for five minutes. One electrode was passed through the rectum into the pelvic portion of the growth and the other into the largest lobe found in the abdomen. Ether was employed. She came out of the operation well, with no apparent results save being at once relieved of pressure on bladder and rectum.

Second operation.—August 4th, 1874, the operation was repeated. She measured twenty-seven inches about the navel and twenty-nine and one-half inches about the most prominent part of the abdomen. This operation was more marked in its effects. She had slight fever, combined with tenderness and soreness of the abdomen, which confined her to bed for a few days. These symptoms passed off with no bad effects.

On November 24th, 1874, she was again seen and "reports to-day the following improvements in her condition: She feels perfectly well in every respect. Her clothes come together two inches less in size. That for the last twelve, if not twenty, years she has been the subject of abdominal cramps very severe and hard to bear; since the last operation they have wholly disappeared. Her severe dysmenorrhea has now become painless. Appetite has returned and is good. Her night sleep which before was troubled and inconstant has now become constant and continuous. She can now lie upon her left side which was impossible before. She feels more like and *is* working more than ever before. Growth diminished."

The reaction in this case was marked and gratifying. February 4th, 1875, she reports her general health better than for three years past. Works very hard at her dressmaking. Appetite, strength, and flesh good. Tumor has risen higher up and is more distinct.

Third operation.—The patient was etherized, and the battery was applied for *seven* minutes, Dr. Stevens, Sr., of Stoneham, being present. One electrode was passed into the vagina and the other into the growth on the left side. No ill results ensued.

Fourth operation.—February 17th, 1875. Abdomen more enlarged. It measured $31\frac{1}{2}$ inches over the most prominent part. It is doubtful whether this enlargement was due to an increase of the tumor, as she had generally increased in flesh. Her diet eschewed flour and starchy food. At 2.30 P.M., in the presence of Dr. Stevens, Sr., one electrode was introduced into the pelvic portion of the tumor through the vagina, and the other into the upper part of the left inguinal tumor. This lobe was more mobile than ever before. The current was passed for *seven* minutes. The immediate effect of this application was more marked than of any other one. The vaginal puncture bled severely for a short time and then ceased. There were severe chills, and the pulse rose to 120. Fever. Great tenderness of the abdomen near the seat of puncture. Thirst, and indeed all the signs of severe peritonitis, were present. These symptoms were energetically treated with a large number of leeches applied to the abdomen; warm fomentations; blisters; veratrum viride by stomach; stimulants, etc. She attributes this to a cold she had taken, but said nothing about it until 1886. She recovered after a short time. The record reads: "Dr. Stevens, her physician, is very much pleased with the marked improvement in this case. The rejuvenation he regards as very remarkable."

The summer months of this year were spent at Nantucket. On her way hither she reported herself at office. She looked and appeared in perfect health. The tumor was diminished in size.

In July, 1876, she went to the Centennial Exposition, and bore its fatigues and sight-seeing better than two healthy young ladies who were her companions. From thence she went on a visit to Illinois and Michigan, returning by Montreal and New

Hampshire, "and during this excursion, occupying two months, she often had occasion to ride over rough roads in farm wagons without springs, yet says she suffered no inconvenience, and felt well every day. She looks and acts as though in perfect health. Twenty-eight months ago she was a suffering invalid, growing worse every day."—Letter of Dr. W. F. Stevens, received May, 1878.

She returned with vigor unimpaired, and now claims that she is as well as any one. The immunity from pain continues. Her bowels are regular; her menses are natural; her spirits are remarkably animated; she has no hesitation in attributing her improved physique and morale to the interference of electricity. She prosecutes her profession of dressmaking vigorously, and works very hard. The growth remains diminished.

Remarks.—It may have been noticed that the vaginal puncture in the last operation was followed by considerable hemorrhage. The question of preference of the site of puncture in pelvic growths may perhaps be partially decided by the experience in this case, as there was no trouble when in the first two applications the punctures were rectal. It is, then, probably better to make the electrodic penetration through the rectum. Other cases show this also.

Mobility. It has been generally found that the electricity increases the mobility of the fibroids.

1886, September 25th. Examined at 1730 Broadway, New York, and found no tumor. Uterus normal. Dr. T. Gaillard Thomas examined the case subsequently, and confirmed the above diagnosis; Dr. Paul F. Mundé also reported that no tumor was to be found on examination.

CASE XLIX.—1877. *Small multilobar fibro-myoid; painful and tender; menorrhagia; anemic and debilitated.*

Result:—Tumor somewhat diminished; pain abolished; restoration of health, vigor, and spirits; in progress.

1884, March 28th. *Tumor size of squeezed lemon.* 1887, March 17th, *no tumor found.* Operator, Cutter.

Mrs. S., of Chelsea, 54 years of age, mother of one child, is a small, thin, very nervous and active woman. Her fibroid is small, hard, and multilobar, extending to level of navel on right. It has existed for four years. Abdomen is painful and tender. She has suffered very much from menorrhagia.

First operation.—On Friday, November 3d, 1876, she was etherized, and in the presence of Drs. Kimball, Wheeler, S. W. Abbott, of Wakefield; Hanscom, of Somerville; and J. F. Pratt and Chipman, of Chelsea, the electrodes were introduced (through lancet punctures previously made in the skin) into the largest lobes, which were located upon the left side. The battery was attached, and the current passed for five minutes. Blood

flowed from the punctures, and collected in the grooves of the electrodes. That upon the carbon electrode was coagulated into a large, firm, and white clot, demonstrating the passage of an electrolytic current through the tissues of the patient. The operation was well borne. Pulse was regular throughout.

Nov. 10th. She feels prostrated from the operation, and complains of a sharpish, sticky feeling about the site of punctures. Otherwise quite well. Sitting up.

Nov. 25th. No perceptible change in the tumor, but a great improvement in health and strength. She is free from pain, and feels as well as ever she did. This her physician reported to me, as she was out making visits when the writer called.

28th. Feeling very well indeed.

Dec. 6th. She insists that she is much smaller, and inspection and palpitation confirm her statement. Tenderness much less than before application. General appearance much improved. It was thought best to defer further interference, as she appeared to be doing so well, and the pain was gone. It was suspected, however, that the same physical changes that occurred in case XL. were going on in this case.

Second operation.—1877, January 4th. Galvanism was repeated. The current was passed for four minutes. Carbon electrode stuck. Pulse 84 throughout. The patient came out with no bad results. Tumor unchanged. Pain removed, and general good health continues. In progress. To decide with certainty, two years' time should elapse.

November, 1877. Doing well.

1884, March 25th. Dr. Wheeler writes, March 23d, that the tumor is of the size of a small lemon squeezed of its juices, and that Mrs. S. is happy beyond description.

March 28th. Examined Mrs. S. in the presence of Drs. Wheeler and Weeks, and found as above. Dr. Warner had examined the case for a fibroid, not knowing what it was, and could find none. Said afterwards: "It was a triumph."

1887, March 17th. No tumor found.

CASE L.—Resumé, 1877. Large abdominal fibro-myoid. Tri-lobed. First application caused a diminution. After the second hemorrhages checked and health restored. Subsequently a recurrence. Another operation. Better results. 1886, two tumors, each the size of a man's gold watch. Operator, Cutter.

1875, March 2d, Mrs. R., widow, aged 42 years, resides with her sister temporarily in C—. Her fibroid had existed at least eight years. She had suffered from frequent excessive and exhaustive hemorrhages, and was much reduced in flesh and strength therefrom. She had a pallid countenance and a waxy look. Because of physical weakness and inability to perform duties that require bodily activity, she was reduced to a state of dependence upon others. Her appetite was poor and digestion weak. Around the body at the navel the measurement was thirty-four inches. The tumor

was abdominal, trilobed, large, and very dense in structure. A large globar lobe lay towards and in the right hypogastric region. Relief had been sought from many physicians without success, and she was quite ready to submit to the experiment of electricity, as her life was miserable and she felt keenly her dependence. Indeed, she had sought the removal of the tumor by laparotomy, and at one time previous her physician states that she got all ready for this latter operation and the surgeon, Burnham, of Lowell, had his instruments laid out to make the section after she was anesthetized, but fortunately gave it up.

First operation.—On the date given above, in the presence of Drs. Wheeler, Shackford, and Weeks, of Chelsea, and Mr. Asahel H. Shurtleff, of Boston, ether was administered and the battery applied to the growth. One electrode was introduced four inches deep into one lobe on the right and the other electrode was penetrated into the opposite lobe on the left side. The full current was continued for five minutes. This application was well borne and its immediate effect was not marked by any systemic or local disturbance.

Second operation.—March 25th she measured thirty-two inches vice thirty-four inches around the navel on March 2d. This indicated a diminution. Tumor more movable. She easily got over the first operation. At 12 m. this day the battery was re-applied in Dr. Wheeler's presence. The electrodes were passed through the large right lower and lateral lobe. On recovering from the ether, she expressed herself as feeling prostrated and in severe pain. A subcutaneous injection of the sulphate of morphia was given immediately, under the influence of which she readily passed with relief.

April 2d, there was tenderness over the points of puncture. Less metrorrhagia. Appetite poor. Complaints of darting pains through the body. On recovering from the effects of the operation she felt so much better that she returned to her home in a distant State where she lived alone in her own house, doing her own work and maintaining herself by her own industry.

1876, May 16th, she presented herself at office, looking very well and in good spirits. The interlobar furrows had broadened and deepened. Tumor movable and arrested. No menorrhagia. Measurement around the body at navel was thirty-two and one-half inches. The increase of half an inch is easily accounted for by the increase in flesh of the body. She regarded the two operations of value to her, inasmuch as now her condition was one of independence and self-support, vice invalidism and dependence.

1877, January 4th, says that she was doing well up to three months ago, when she suffered from a severe attack of peritonitis which has lasted in its effects up to the present time.

She complains of great pain in the right side of the abdomen. Constipation, "heats and flashes" all over the body trouble her much. (Possibly due to "change of life.") General appearance very good. No pallor. Countenance of a healthy brown. She

thinks the tumor increased in size since October, 1875. Since her present attack of peritonitis, she has numbness and inability to move her lower limbs, and has a desire to pass her urine often.

She strongly urges the removal of the tumor by abdominal section.

Third operation.—January 17th, 1877, the battery was applied for the third time. The electrodes were passed in on each side opposite to one another; the current was maintained for *six* minutes. The right-side electrode was entered with the expenditure of considerable force, while the left-hand electrode went in readily.

January 19th, she is suffering much with pain over the right puncture. February 8th much better. Returned to Maine. Is pleased with this application more than any other. It was very profound in its effects. August 8th, 1877, is working hard. Increased in flesh. General health excellent.

October 18th, thought the tumor diminished. In good health. 1879, December 30th, twenty-nine and three-fourth inches supine position; standing posture twenty-nine inches round the navel. Over the right groin a bulging, perhaps it is a hernia. Complains much of severe pain in the back, so much so that "it seems as if I could not live." Ready for extirpation. Uterus does not seem to be involved at all.

Fourth operation.—1880, January 26th. Present, Drs. J. Marion Sims, of New York; Gilman Kimball, of Lowell, M. G. Wheeler, of Chelsea; Boardman, of Chelsea; Prof. Reynolds, of Boston; W. H. Baker, of Boston; H. O. Marey, of Boston; A. L. Norris, of Cambridge; W. S. Brown, W. F. Stevens, of Stoneham; J. A. Douglass, of Amesbury; Weeks, of Chelsea, and Warner, of Boston.

Ether. Abdominal penetration. 'Ten minutes' current. 95-115 pulse. Tumor very hard and dense.

Dr. Sims expressed himself satisfied, but thought the needles too long. Punctures each made with lancet.

1880, March 2d, twenty-nine and one-fourth inches. Has pain in right groin. Chills. Tumor hard. Appetite not good. Operation took good hold of her. Belladonna plaster to bowels. Is unwell a good deal. Never so before. Has taken ergot.

1886, August 5th, saw her. Tumors the size of man's gold watch, one each side of navel. Calls herself cured.

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